- Riegel's new bleached board paper machine
- Pipe, fittings, valves and pumps in water supply and waste disposal
- Kodak's new supercalender
- Chemigroundwood pulp from poplar

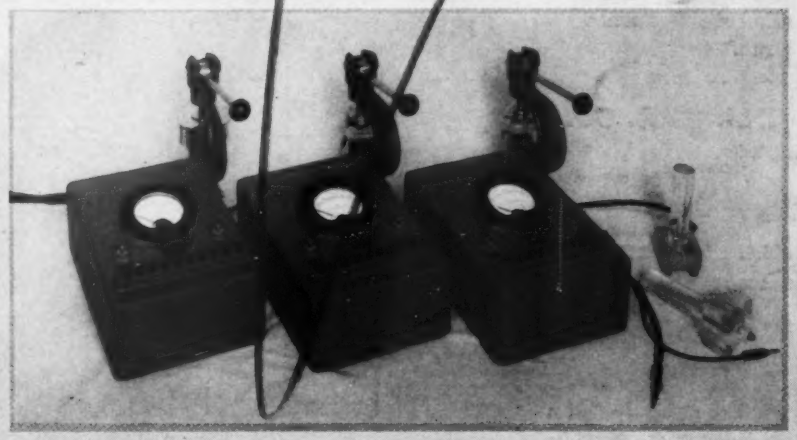
The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

TECHNOLOGY DEPT.

NEW MEMBER OF THE HART FAMILY

In outward appearance much like the long familiar K-103 but including many new features



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DETROIT

Fully automatic temperature correction for both the temperature of the sample and the temperature of the electrode parts of the instrument.

When applied to paper board and other heavy stock, a special electrode corrects for moisture gradient so apt to be found after a drying operation.

Ask for Bulletin KR-209

HART-MOISTURE-METERS

335 WEST ISLIP BOULEVARD
BABYLON L. I., N. Y.

equipped for "economy in the long run"

This new 262" machine of Georgia-Pacific Paper Company, designed for 125 lbs. of steam in the dryers and a speed of 2,000 F.P.M., is fully equipped with ASTEN Dryer Felts—another example of how ASTEN Felts so often are selected for "economy in the long run."

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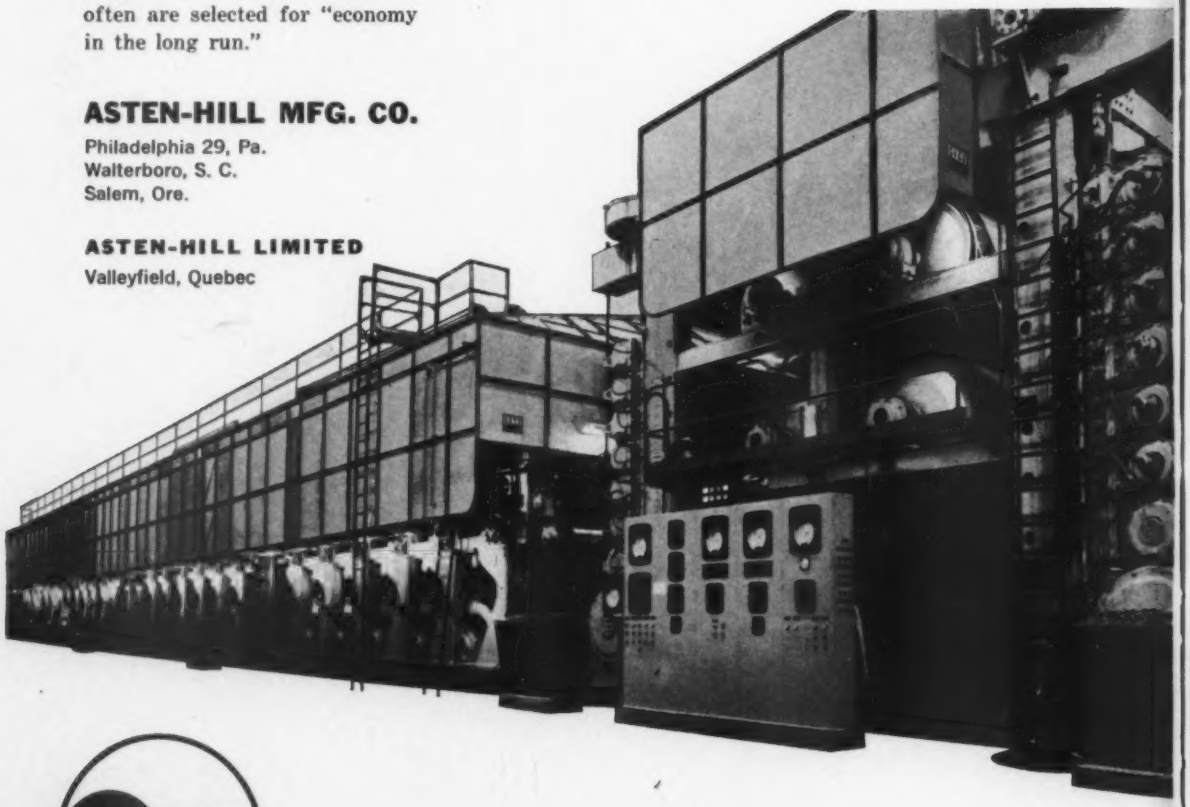
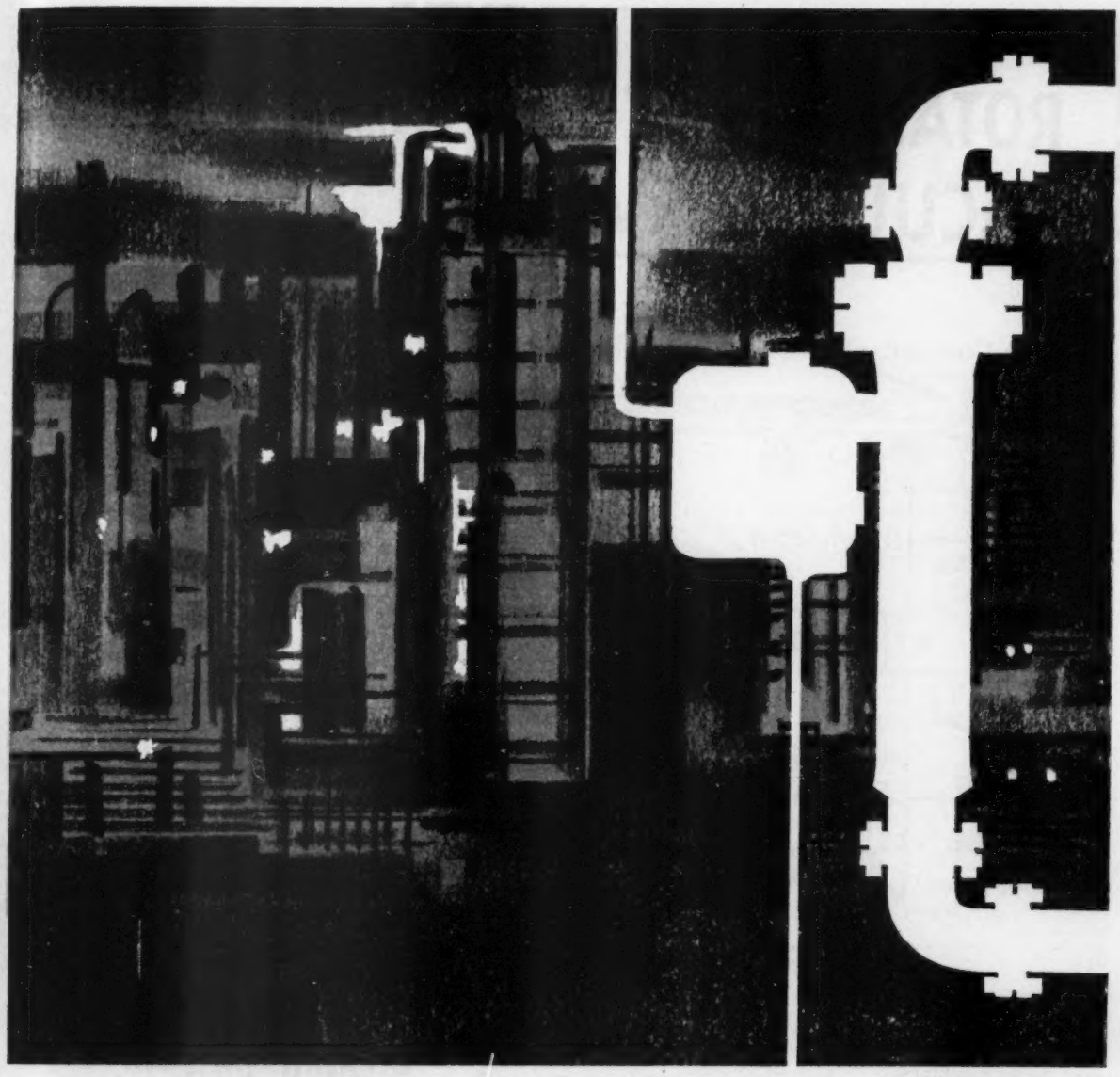


Name and trademark registered.



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High in sensitivity and accuracy! For full float range operation the Fisher Level-Trol is factory calibrated or zero adjusted to produce an accurate 3 to 15 psi or 6 to 30 psi signal output. Designed, engineered and universally accepted for most liquid level control, liquid level indication and interface control problems. Has simple liquid level adjustment indicating dial—combined pneumatic proportional band and specific gravity adjustment. Heavy-duty built—easy to operate—simple to service. Available with cage units for external mounting or internal top or side flange mounting with float sizes from 14" to 120".

Write for Bulletin F4A for full details.

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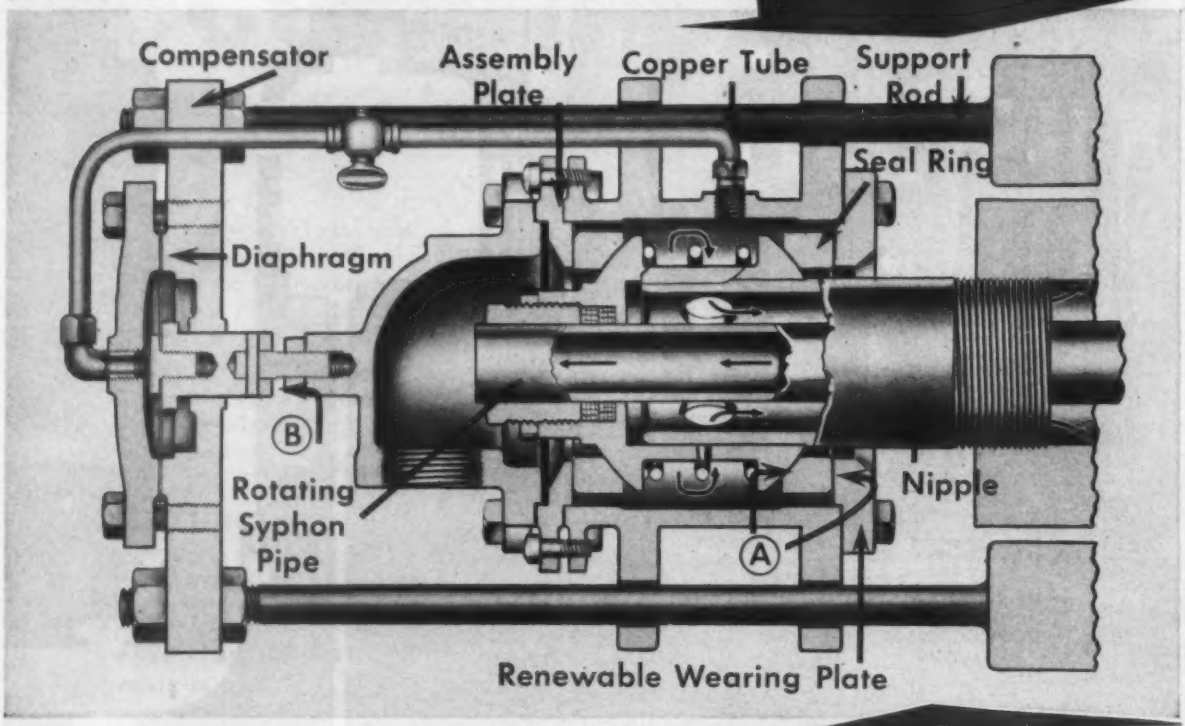
ROTARY JOINT for VACUUM SERVICE...



This one wasn't easy—a rotary *pressure* joint for *vacuum* service. It is used principally on the wet end section of some paper machines.

A modification of the Johnson Compensator does the trick. It exerts force by means of pressure against one side of a diaphragm, or vacuum against the other side. Mounted as shown, with vacuum in the joint transmitted to the Compensator, it produces a force at B which results in just enough pressure at A to maintain a tight seal. It works equally well under high or low vacuum conditions—maintains a constant sealing pressure regardless of any fluctuations.

This Type L-N rotary joint, designed to accommodate a rotating syphon pipe, functions just as it would in normal pressure service. The seal between rotating assembly and stationary housing is accomplished without any packing. No lubrication or adjustment is needed. The support rods carry all the weight of body and connections—permit the rotating assembly to "float" freely inside. Special assembly plate provides easy access to syphon pipe without disassembling the joint.

Here you have fresh evidence that Johnson can furnish types and sizes of rotary joints for all operating conditions. Johnson started the idea in the first place, is far ahead in know-how. For complete information on the Type L-N Johnson Joint and the Compensator write for copy of Bulletin N-2002.

THE JOHNSON CORPORATION

845 WOOD STREET • THREE RIVERS, MICHIGAN

Rotary Pressure Joints • Direct Operated Solenoid Valves

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 40 **NUMBER 7** **OCTOBER 1958**

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From our point of view..

Genetics shows the way to improved pulpwood production

B. Zobel's report on the relation of wood genetics to paper strength and pulp yield, presented at the 12th Alkaline Pulping Conference, is a major contribution to an eventual successful development of fast-growing trees having a significantly higher cellulose content. His report also makes it increasingly clear that the time has come for a more vigorous and determined effort in applying plant genetics to the development of high-quality pulpwood.

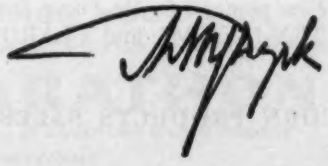
The known facts show that higher wood density and higher cellulose content found in individual trees of the same species is not so much a function of environment as one of heredity. This is evident from the wide range of cellulose contents (varying as much as 10 per cent) shown by trees growing side by side under apparently identical environmental conditions.

These observations make it extremely plausible that a number of fast-growing strains of high-quality pulpwood can be developed by a process of selection and cross pollination.

A factor that undoubtedly will have a retarding effect on the development of such trees is their slow growth and the consequent long waiting period before the inherent qualities of any individual tree become apparent. This situation is further complicated by the observations that during the first 8-10 years of the tree's growth it produces nothing but "juvenile" wood of relatively low density and low cellulose content. Only after about the tenth year of growth does it begin to deposit rings of mature wood that has a higher density and higher cellulose content. This behavior also applies to new growth, with the result that all top wood is of the "juvenile" type.

The program of selection might conceivably be accelerated if a correlation were to be established between the cellulose content of the "juvenile" and mature wood in the same tree. If, for instance, a relatively high cellulose content in juvenile wood were to correspond with and presage a high cellulose content in subsequently developing mature wood, it should not be necessary to wait 15-30 years before being able to identify a successful tree under development. A series of test determinations on "juvenile" wood might be all that is needed to predict the future wood qualities of the mature tree.

Possibly the most spectacular achievement by plant geneticists is the development, through a process of selection and cross-pollination, of high-yielding rubber trees in Southeast Asia, where yields have been increased from an average of 300 lb. of dry rubber per acre to yields as high as 6000 lb. While nothing as dramatic need be envisaged in the development of high-quality pulpwood, even a 10-per cent increase in cellulose content would add substantially to this nation's pulpwood resources.



An important new reason to turn to Corn Products for your starch needs

New continuous cooker makes starch coating easier

Here is a new way for paper makers to achieve uniformity in starching operations: start with the grade of Corn Products starch best-suited to your type of operation—and use our newly-developed continuous starch cooker. This new cooker permits a uniformly cooked starch to be introduced at a predetermined rate to the wet end of the paper machine. On enamel papers, one well-known manufacturer* noted the following improvements: increased bursting strength and folding endurance, improved wax pick resistance, reduced two-sidedness of the base sheet, better furnish retention on the wire, reduced fuzz in the coating base stock.

The continuous starch cooker is still another important reason to turn to Corn Products for your starch needs. Of more basic importance are the starches themselves: a complete assortment of high-grade, quality-controlled starch in such a wide variety that *they can be tailor-made to meet your particular requirements.*

For complete technical assistance on this or any other starch problem take advantage of the widespread knowledge and facilities at the disposal of our technical representatives. As the world's largest producers of starch, our knowledge of this diversified product is unsurpassed. This knowledge is always at your service by calling our nearest sales office or writing direct.

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CORN PRODUCTS SALES COMPANY • 17 Battery Place, New York 4, N. Y.

*name upon request; a reprint describing this installation is also available

TOM BIGBEE SAYS:

"Gauges eliminate guesswork in quality control of Naheola pulp!"

"Yes, sir—you're about as close as you can get to foolproof quality control here in this new Marathon pulp mill at Naheola.

"Talk about precision instruments and controls—man, there are 23 different control panels (located in strategic spots to prevent any loss of motion) and there are more than 300 automatic control devices plus more than 200,000 feet of transmission tubing, to speed production and control quality. Why, even the treatment of waste materials from the pulp-making operation is remotely controlled from a panel in the mill laboratory.

"You should see this instrumentation in action. I saw the 'start-up' last month and these first experimental runs have everyone excited. The success of the very first runs surely proved that gauges eliminate guesswork!

"Of course, even though we're excited, we're not really surprised—not with the experience the Marathon people have at their disposal. When you combine their store of pulp-making knowledge with the modern equipment they have here in Naheola you're bound to get quality pulp—there is no guesswork about that!"

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NAHEOLA, ALABAMA. A Subsidiary of:

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your paper finish meets specifications exactly

with Clinton Products

For your paper finish, you can be sure of highest strength, efficient coating and desired penetration with Clinton products from corn. These ingredients—starches and dextrins—produce the same results every time, because:

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Three analytical control laboratories and several single-purpose testing stations are located at strategic points in our plant. They check every stage in the processing of *all* products... they check *all* finished products to be sure specifications are met exactly. That's why you can depend on Clinton products to do the job for which they are needed.

Your Clinton salesman can help you select the right products to make the finish you want. And, should you need special production advice, *prompt* technical service is available when you need it. Call your Clinton salesman today, or write:

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CLINTON ...*Where research today improves tomorrow's product*

Picture of a Money-Saving Moment

...shows the Cameron Shaftless Unwind Pickup about to lift a mill roll to unwind position at the feed end of a Cameron 14 Slitter-Rewinder at P. H. Glatfelter Co. The automatic loading operation is controlled from the operator console. The mill roll capacity is 6" to 92" wide, and 60" diameter.* Features include: hydraulically operated pickup arms; automatic centering of mill roll; manual skew adjustment; two water-cooled brakes; edge guiding; mill roll oscillation; and removable chucks adaptable for various sizes of paper cores, metal-ended cores, or iron pipe cores.

**Also available in smaller models for 42" diameter roll or larger models for 72" diameter roll.*

JACK MILLER, Paper Division Superintendent, and STEWART BURNS, Finishing Department Superintendent, checked all possibilities, then chose Cameron. P. H. Glatfelter Co., established at Spring Grove, Pa. in 1864, is a completely self-contained paper-making operation, from vast company-owned forests and water supply reservoirs to the fine book, bond and converter specialty papers for which their name is famous. Roll production equipment at Glatfelter includes two Cameron 14 Slitter-Rewinders and a Cameron 19 Mill Type Winder.

Why Glatfelter Chose the CAMERON Shaftless Unwind Pickup

The new Cameron Shaftless Unwind Pickup at Glatfelter increased operating speed by 50% compared to shaft-type backstands. It reduced set-up time 75%. It eliminated troublesome web "whip", thus assuring reliable quality control, even at top speed.

To find the best unwind equipment available today Glatfelter management investigated all possibilities. They liked Cameron's simplicity of operation. They saw its promise of dependable high productivity. They recognized the *inward excellence* of Cameron's new concept of shaftless design and construction... and they chose Cameron.

Reports from Glatfelter tell us that the Cameron Shaftless Unwind Pickup has surpassed its promise in speed, quality, dependability and economy of operation.

Now, don't let time and money losses pile up. Whether your need is to correct a minor fault in roll production, or to engineer a major installation of slitting and roll winding equipment, it always pays to call in a Cameron team. Do it today!

Cameron Machine Company, Franklin Road, Dover, N. J.

Canada: Cameron Machine Co. of Canada, Ltd., 15 Hatt St., Dundas, Ontario
France: Batignolles-Chatillon, 5 Rue De Monttessuy, Paris (7e) France

Built by Cameron's team of specialists

52 years devoted exclusively to the design and manufacture of slitting and roll winding equipment.

AA-385

Work with your AIM*. . . Halifax Paper does . . .

Strapped paper rolls arrive in top condition

HALIFAX PAPER COMPANY, ROANOKE RAPIDS, N. C., sought a way to ship carloads of kraft paper without damage occurring to rolls while in transit. So they called in their Acme Idea Man.

Together they worked out a bracing method that not only insures arrival of paper in damage-free condition, but saves money and man-hours. (Idea No. U1-13)

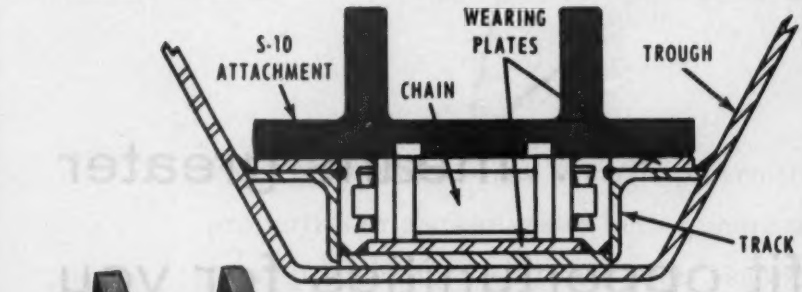
Rolls of paper are positioned over heavy-duty Acme Steel Strapping placed lengthwise on the floor of the box car. Then the strap is brought over the top of the rolls, tensioned and sealed. This binds the rolls in place into units, preventing damage to the paper caused by in-transit vibration and impacts. And, the shorter time it takes to secure the rolls adds up to a considerable saving.

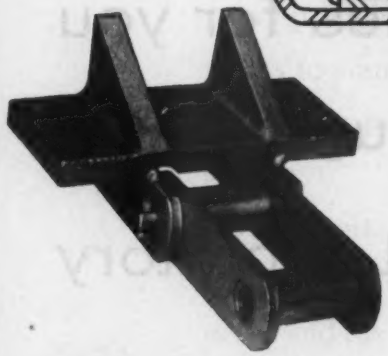
Acme Idea Man E. S. Lumpkin aids Halifax Paper and many other companies with their product protection problems.

***Work with your Acme Idea Man.** His ideas for protecting products —and saving time and materials while doing so—have proved effective for hundreds of companies. Write Dept. PKU-108, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois.
In Canada, Acme Steel Company of Canada, Ltd.,
743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

SS-150+ chain and S-10 attachments team up for rugged pulpwood service





Absorbs impact shocks

S-10 attachment on Link-Belt rugged SS-150+ chain has broad sliding surfaces that contribute to long wear-life of both track and chain. Impact shocks from logs hitting attachment are absorbed by track rather than chain joint. And for extra protection against corrosion fatigue, Link-Belt offers a choice of corrosive-resistant materials and plating.

Combined strength and stamina assure long-life conveying

Equipped with S-10 attachments, Link-Belt SS-150+ chain easily withstands the grueling day-in, day-out punishment of pulpwood conveying. Its ruggedness assures top operating economy by holding down maintenance and replacement costs, minimizing conveyor shutdowns.

Design Refinements

Long-life design of SS-150+ incorporates sidebars of selected bar steel, accurately formed and machined for tight press fit of pins and bushings. The latter are made from hardened steel, closely size-controlled, and locked against rotation in sidebars.

Hard Joint Surfaces

Joint surfaces of this steel fabricated chain are up to five times harder than standard malleable—resist wear resulting from repeated shock loads and constant exposure to cutting action of abrasive particles. They repel gritty materials, prevent troublesome packing.

Southern Mill uses SS-150+ chain with welded flights

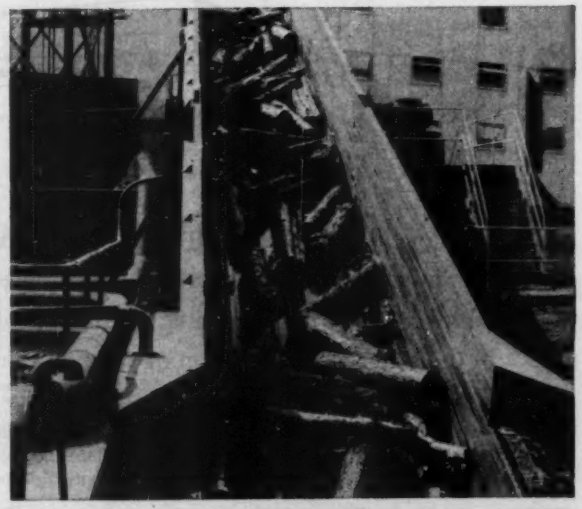
Link-Belt SS-150+ chain is available with either S-10 attachments or welded flights. On log conveyor (above) pushers are welded directly to sidebars.

In addition to the S-10, Link-Belt offers numerous other attachments which allow economical adaptation to specific conveying and elevating needs.

SS-150+ conveyor chain lasts over twice as long

In the pulpwood conveying operation shown at right, brutal impact and heavy loads plus severe abrasive and corrosive conditions caused failure of ordinary chain after only 6½ months of service. It was replaced with a Link-Belt SS-150+ single-strand inclined conveyor with S-10 attachments which was still going strong at 20 months.

With its average ultimate strength of 100,000 lbs.—plus hardened pins, bushings, steel sidebars and joint bearing surfaces—the SS-150+ chain is ideal for such extremely severe applications.



HEADQUARTERS for chains, sprockets and other Link-Belt products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Refer to the yellow pages of your local telephone directory.

LINK-BELT

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,080

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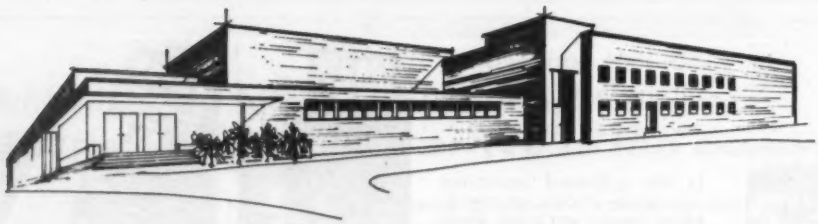
...means greater profit opportunities for you through a new Technical Service Laboratory



Du Pont's new Pigment Technical Service Laboratory can help you make the most profitable use of pigments in your paper products. Skilled specialists, experienced in many facets of papermaking, utilize the most complete and modern research facilities of their kind in the solution of your problem.

• For information on Du Pont expanded service facilities, ask your Du Pont Pigments representative or write: E. I. du Pont de Nemours & Co. (Inc.), Pigments Dept., Wilmington 98, Delaware. In Canada: Du Pont Company of Canada (1956) Limited, P. O. Box 660, Montreal, Quebec.

PROGRESS IN PIGMENTS

IN PIGMENTS

Pigments are basic—and every improvement in their properties or use can mean better, more profitable paper products for you. To Du Pont, a supplier of pigments to your industry, this is a compelling reason to maintain a program of progress in our products and service.

An important part of Du Pont's dynamic continuing program is the spirit of progress—a sensitivity to your needs and the requirements of the paper industry.

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PIGMENTS DEPARTMENT

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. . . *THROUGH CHEMISTRY*

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PORTA-PEELER
LOG BARKER

The Practical Answer to Multi-Unit Barking Operations

Impco offers this completely new portable unit for peeling bark from any type of wood. Designed to bark logs in the three to twenty-six inch diameter range, the side-fed Porta-Peeler is offered in various models for bolts from four to ten feet in length. 100% removal can be obtained even with crooked, frozen hardwood. One man can easily *Porta-Peel* four sticks per minute. For further information, write for Bulletin F1-2.

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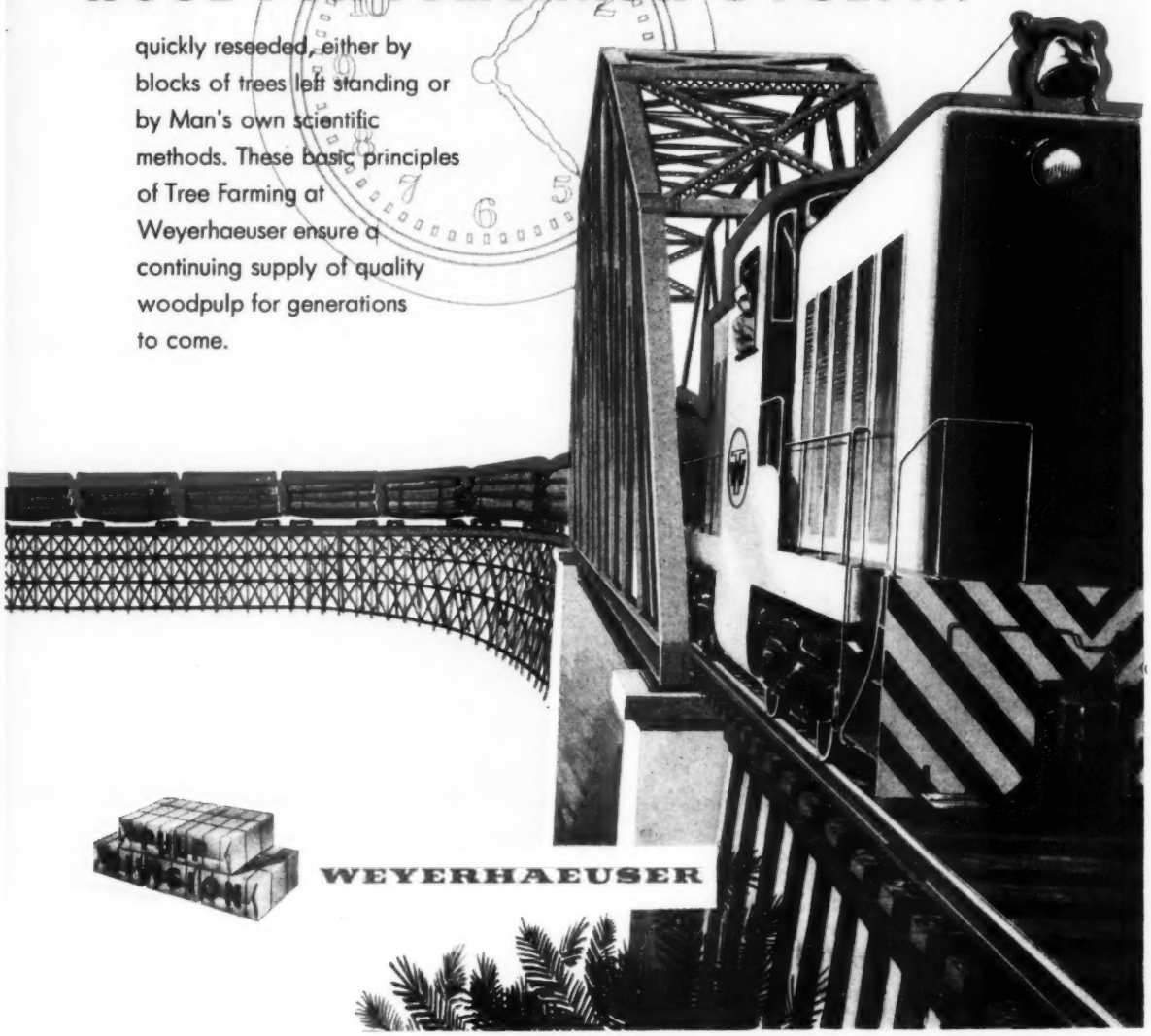
WOOD FOR TOMORROW'S PULP...

quickly reseeded, either by blocks of trees left standing or by Man's own scientific methods. These basic principles of Tree Farming at Weyerhaeuser ensure a continuing supply of quality woodpulp for generations to come.



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AND

- THE *HEAVIEST* ROLLS

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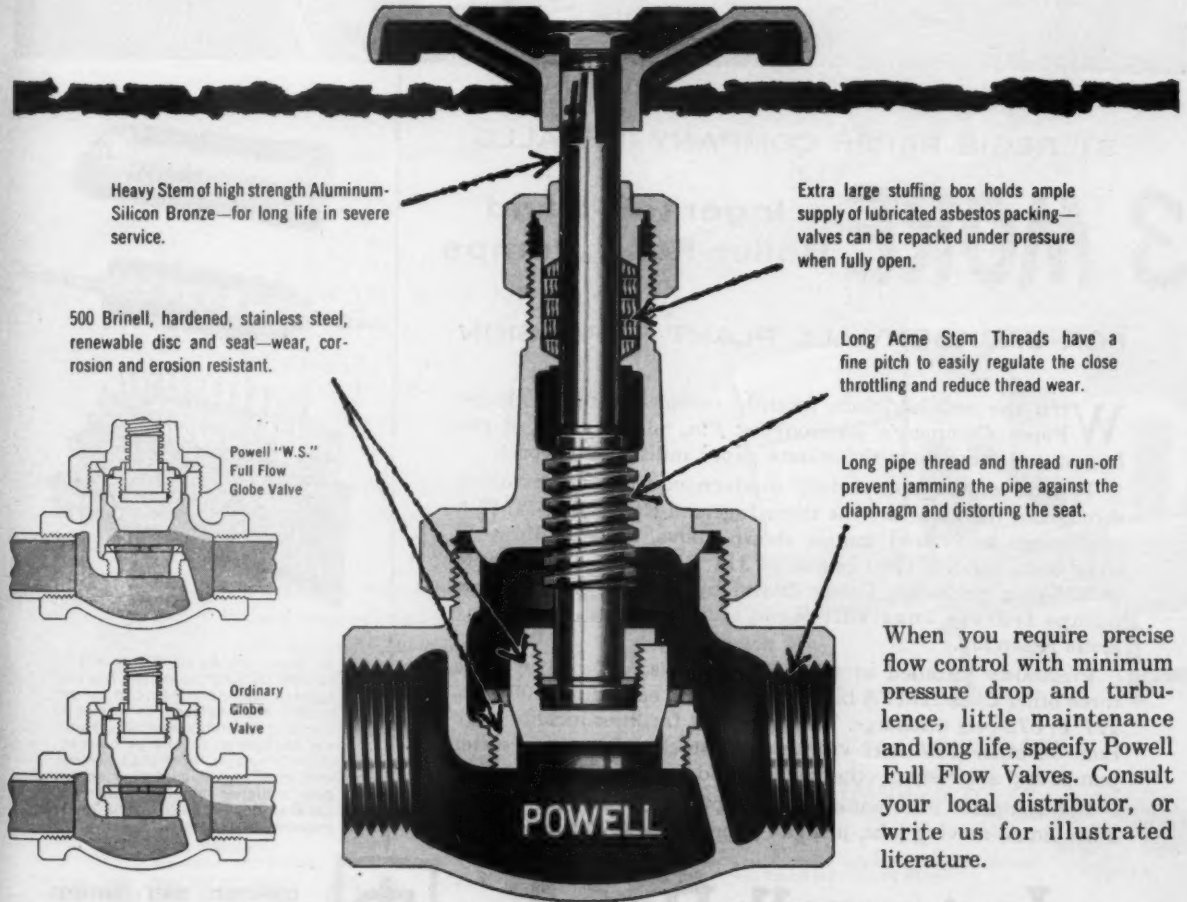
BULLETIN!

POWELL introduces new member in world's largest family of valves

Powell engineered "Full Flow" bronze valves are now available in a full line: the brand-new 150-pound screwed end Globe Valve, in addition to the well-known 200-300 pound Screwed and the 150-300 pound Flanged Globe and Angle Valves.

Although designed by Powell to assure maximum flow with minimum pressure drop and internal turbulence, these valves can be throttled to permit only the minutest amount of fluid to pass through. And, if desired, they can be supplied with Indicator Collar, Arm and V-port Disc for quickly determining flow and holding it constant.

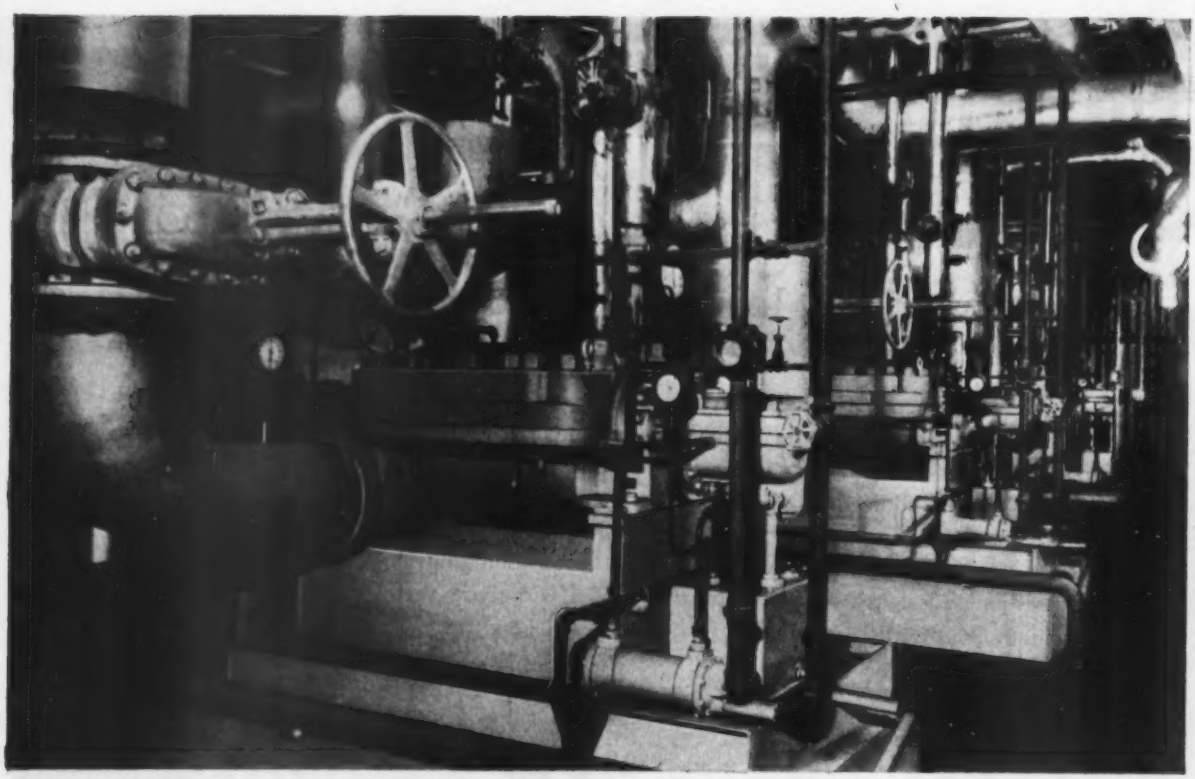
Compare these advantages of Powell Full Flow valves:


Heavy Stem of high strength Aluminum-Silicon Bronze—for long life in severe service.
Extra large stuffing box holds ample supply of lubricated asbestos packing—valves can be repacked under pressure when fully open.
500 Brinell, hardened, stainless steel, renewable disc and seat—wear, corrosion and erosion resistant.
Long Acme Stem Threads have a fine pitch to easily regulate the close throttling and reduce thread wear.
Long pipe thread and thread run-off prevent jamming the pipe against the diaphragm and distorting the seat.
Powell "W.S." Full Flow Globe Valve
Ordinary Globe Valve
POWELL

When you require precise flow control with minimum pressure drop and turbulence, little maintenance and long life, specify Powell Full Flow Valves. Consult your local distributor, or write us for illustrated literature.

Fig. 2600 (Sectional)—150-pound "W.S." Full Flow Globe Valve, Screwed Ends

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**



ST. REGIS PAPER COMPANY INSTALLS

3 MORE Ingersoll-Rand Boiler-Feed Pumps

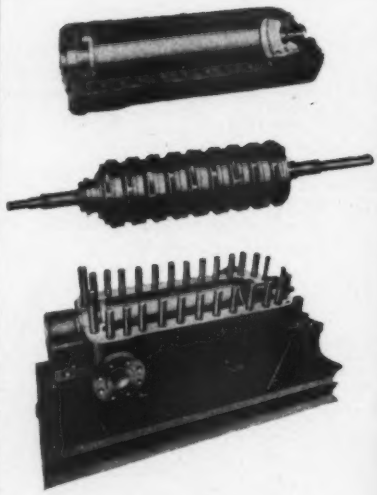
FOR JACKSONVILLE PLANT EXPANSION

WITH the new additions recently completed, the St. Regis Paper Company's Jacksonville, Fla., plant is one of the largest and most up-to-the-minute paper mills in the world.

Typical of the completely modern equipment installed throughout the plant are the three Ingersoll-Rand Class HMTA multi-stage boiler-feed pumps shown above. Each of these 5-stage units handles 1200 gallons of 312°F feedwater per minute at 875-psig discharge. Direct driven by electric motors, these pumps feature Ingersoll-Rand's distinctive Unit-Type Rotor Assembly.

Previously installed at the original Jacksonville plant were three other Class HMTA boiler-feed pumps, each rated 400 gpm, 227°F, 875-psig discharge. The new plant facilities include more than 30 other I-R units—fan pumps, stock pumps, raw water pumps and a variety of other general and special-purpose pumps.

For complete information on any pump for boiler feed and other liquid-moving jobs, just call your Ingersoll-Rand engineer.



In Ingersoll-Rand Class HMTA pumps, the shaft, impellers and stationary channel rings can be removed and replaced as a single, compact assembly without disturbing suction or discharge connections. Positive interstage sealing and multiple-volute design contribute to higher sustained efficiency, greater dependability and lower maintenance costs.

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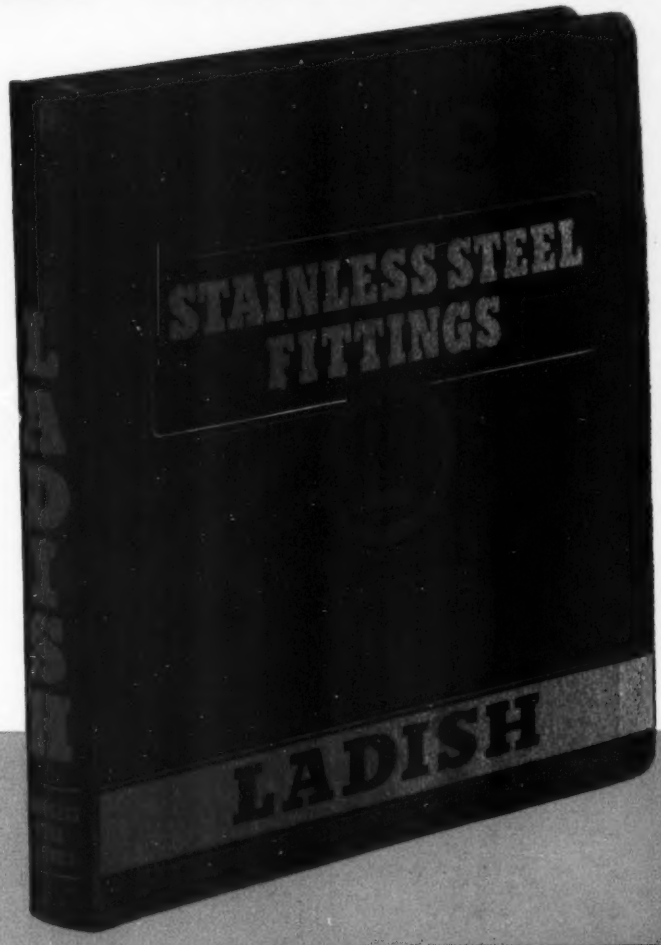

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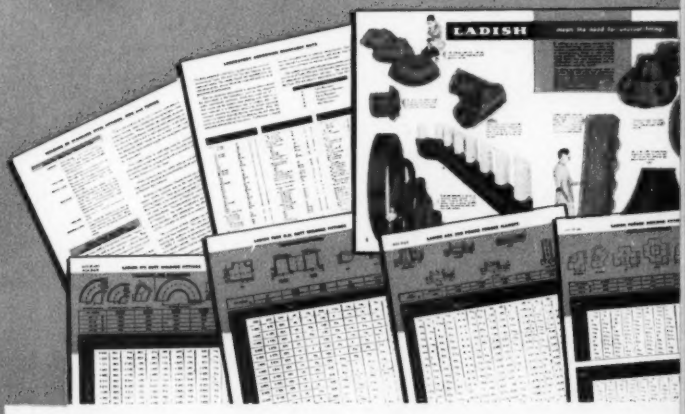

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The tissue she uses has greater strength and better physical properties because it has been processed on a Bauer Pump-Through Refiner. Tissue manufacturers are finding extra sales advantages because the Bauer Refiner gives better strength characteristics to the pulp and more uniform tissue formation. This refiner, by its unique action reduces fiber thickness but retains fiber length. Write for specific recommendations.

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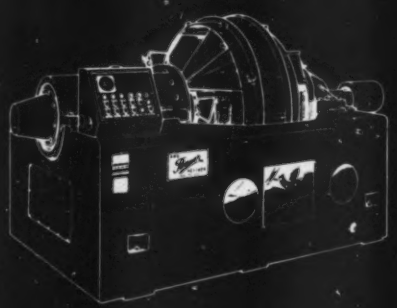

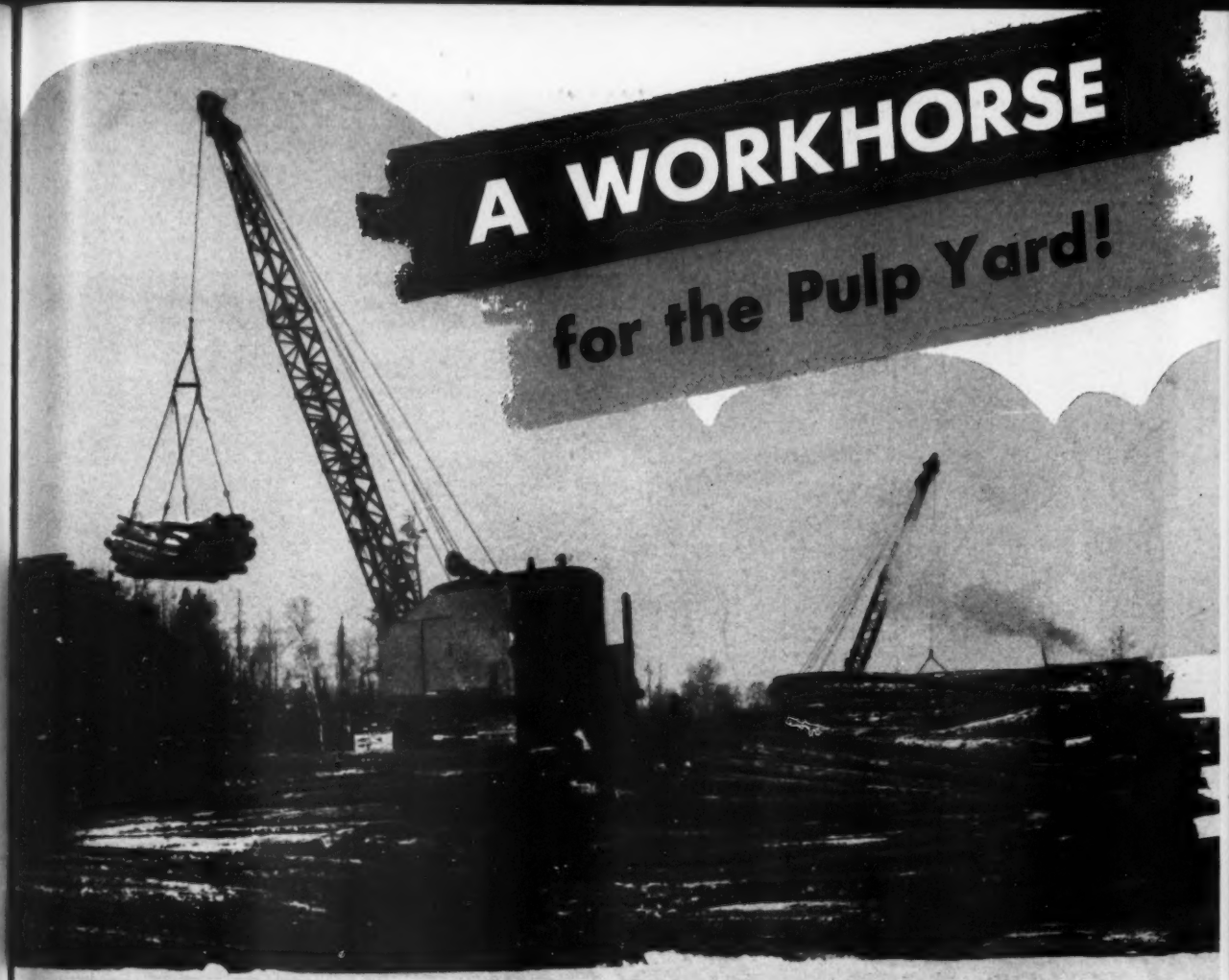

The workhorses of the pulp yard! That's what these Model 25 Northwests are. No paper mill job is too tough for them. Here are two Model 25 Northwest Cranes in the yard of the Long Lac Pulp and Paper Co., Ltd., at Long Lac, Ont., Canada. They work in all kinds of weather. Their crawlers make areas available for storage that would be impossible to use with locomotive equipment. They can handle trucks anywhere, stack or jackstraw, climb on piles or on to railway flat cars or drop end gondolas.

Smoothness of operation comes with the Feather-Touch Clutch Control that utilizes the power of the engine to throw the heavy drum clutches—no pumps, compressors or other delicate mechanisms, often affected by weather and temperature. Uniform Pressure Swing Clutches eliminate grabs and jerks in swinging and bring accuracy to spotting big loads. A wide range of boom hoist equipment to choose from, a third drum and many other Northwest advantages make it possible to handle any lifting problem. There are many other features you should know about. Let a Northwest Man tell you more about them. There are several capacities for paper mill work.

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Feature articles

View of Riegel's new Beloit Iron Works 236-in. bleached board machine. In the foreground are seen the Foxboro magnetic flow meter, Black-Clawson jordans and Bauer Bros. Centri-Cleaners.

Carolina Belle — Riegel's new bleached board paper machine

A. W. J. DYCK

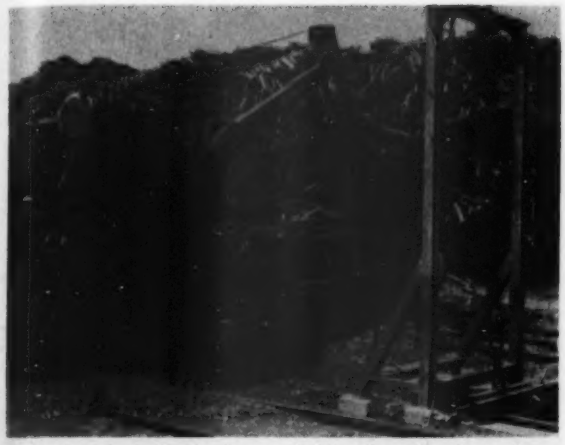
▶ The new Beloit 236-in. machine, two modern bleach plants each two ClO_2 stages, an on-the-machine air-knife coater and widespread use of stainless steel equipment contribute largely to the top-quality bleached board output.

CAROLINA BELLE, Riegel Paper Corp.'s new 236-in. fourdrinier paper machine at Acme, N. C., went into production on May 30. This latest installation culminated a $50 million expansion program that was started in 1951. The new machine will produce high-grade "food board" for food packaging, drinking and food cups, folding cartons and special papers for tabulating cards, shipping tags, postcards, file folders, linerboard and advertising printing.

The capacity of the new machine is in excess of 300 tons per day of top-quality paper. Its start-up was so smooth that within 48 hrs. running the machine was producing commercially salable paper.

To insure maximum cleanliness and to avoid all possible chance of contamination of paper stock, the new mill features widespread use of stainless steel in all equipment that comes in contact with paper stock. Accordingly, the stock and water systems are practically 100 per cent stainless steel, while most major machines are either solid stainless steel or stainless steel clad. This includes the wet end of the paper machine, the three hydrapulpers and the jordan fillings. All tanks and chests are made of sanitary tile.

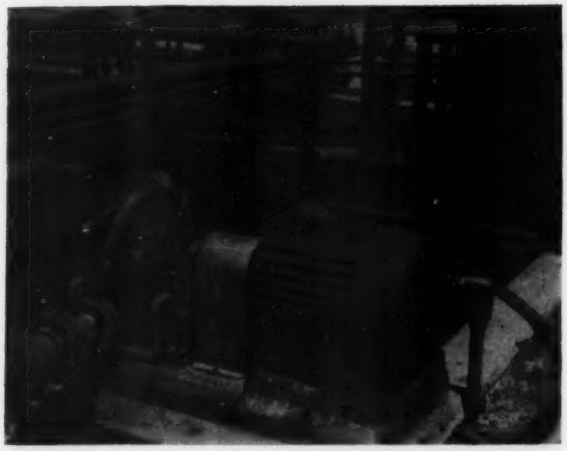
Pulp is bleached in two of the most modern bleach plants in existence. Both are equipped with two stages of chlorine dioxide bleaching that insure unusually high brightness of the papers. Other interesting features are an on-the-machine air-knife coater and the most up-to-date scientific instruments and automatic controls, including magnetic flow meters, photoelectric eyes, Accuray basis weight



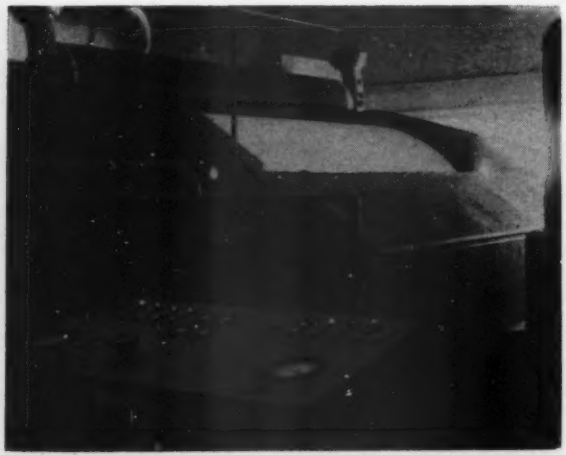
A Lorain pulpwood unloader supplied by Thew Shovel Co. dumps the logs into flume.

Link-Belt revolving disc screens and grit collector elevators keep flume water clean.

One of two Goulds 12,000-gpm pumps that are used on flume water circulation.



A 300-gpm Goulds pump supplies water to the spray nozzles of the revolving disc screens.



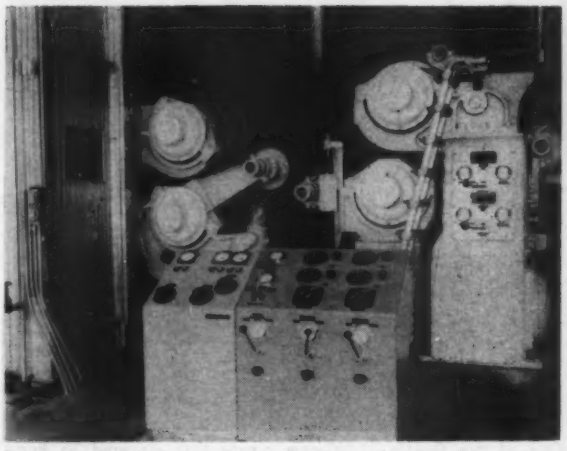
One of Improved Machinery Inc.'s 11 vacuum washers used in the 5- and 6-stage bleach plant.

Black-Clawson Miami No. 5 pressurized jordans driven by 400-hp General Electric motors.

Foxboro magnetic flow meter used in the stock proportioning system.

Black-Clawson 17,000-gpm fan pump and DeZurik consistency regulator.

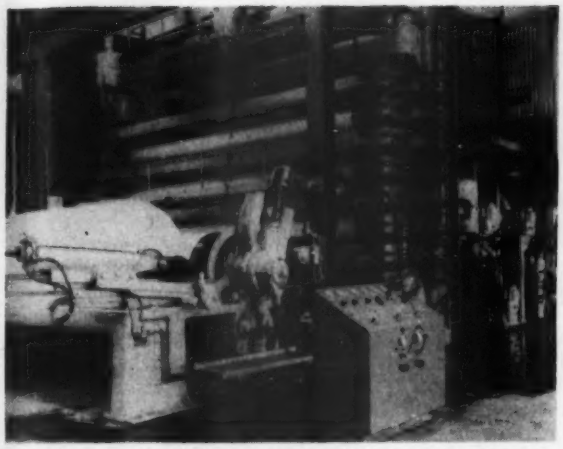
Bauer Bros. No. 623-4 type Centri-Cleaners, each of 650 gpm capacity.



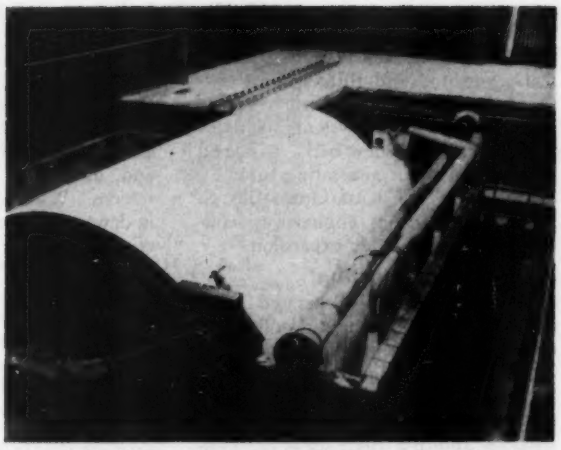
Beloit Iron Works first and second presses; the second press is an inverse press.

Beloit Iron Works size press located between the fourth and fifth dryer sections.

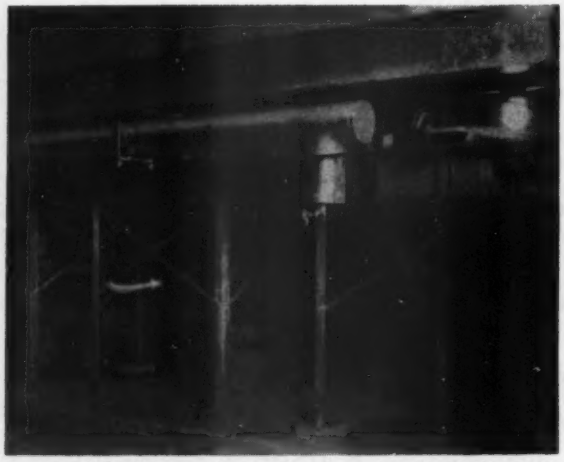
Dryers are enclosed in Ross Engineering hood equipped with automatic lifting doors, exhaust fans and ducts, etc.



Beloit Iron Works calender stack and reel; each calender stack has a 34-in. dia. king roll and seven 16-in. dia. rolls.



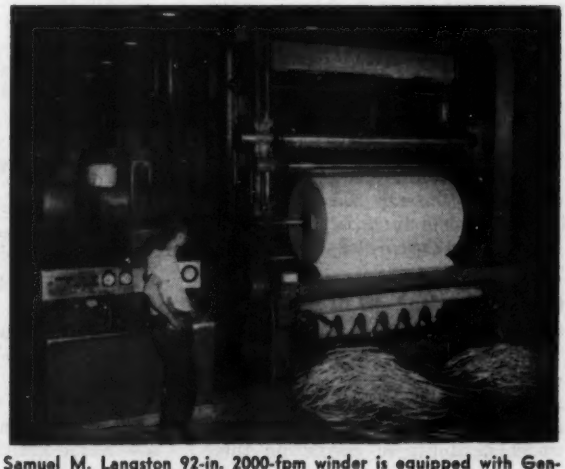
Improved Machinery 11½- × 16-ft. vacuum saveall receives broke from the hydrapulpers and white water from the wire and couch pits.



Gary Steel Products stainless steel tanks equipped with "Lightnin" mixers used in the preparation of chemical additives used on the coater, size press and calenders.

Ingersoll-Rand 10 × 11 ES air compressor supplies compressed air for instruments. Compressed mill air is supplied by an 18½ and 11½ × 8½ XLE compressor.

Beloit Iron Works Model-L winder and backstand where the reel is split into rolls of desired width.



Samuel M. Langston 92-in. 2000-fpm winder is equipped with General Electric Speed-Variator drive.

controller gauges and valve-position recording instruments.

The finishing area features an automatic finishing and roll-handling system, while an unusually complete combustion control system regulates combustion in the new bark-, gas-, and oil-burning steam generating unit.

J. E. Sirrine Co. of Greenville, S. C., was retained as engineering contractor for this latest expansion.

Wood yard operation

The wood yard is operated on a controlled basis with a wood turnover every 30 days to yield good quality pulp. Pulpwood is transported from the wood pile or directly from railroad cars in a recently installed flume system. In addition there is a log conveyor that transports logs from the wood pile to the barking drums. Logs are lifted from the flume to the barking drum level by a three-strand chain conveyor installed at the end of the flume.

The flume is equipped with a bark collector, inclined 60° and operating at a chain speed of 30 fpm. It is installed in a channel 7 ft. wide by 8 ft. 10 in. deep and designed to collect 8 cfm of bark floating down the channel. The bark collector delivers its bark to an 18-in. wide belt conveyor that has a 6-ft. lift at the discharge end.

The flume system is further equipped with two 12-ft. diameter revolving disc screens equipped with spraying nozzles and a 300-gpm pump. There are two grit collector-elevators installed in two channels, each 10 ft. wide and 10½ ft. deep. The grit collector-elevators are designed to collect 3.3 cfm of grit and elevate it to a height of about 5 ft. above the channel level where it is discharged into a hopper. The grit hopper discharges into a drag conveyor that handles 3.3 cfm of grit to the grit pile or truck. Water is circulated through the flume by two 24-in. 12,000-gpm pumps.

An 18-ft. diameter rotary table feeder feeds the logs to the tumbling type barking drums. The barked logs are then sorted on a 72-in. wide belt conveyor equipped with pivoted plow.

Accepted logs are chipped, and the chips pass through screens prior to being stored in three large chip silos, each with a capacity of 100 cords of wood.

Chip digestion and brown stock washing

The chips are digested in nine 3300-cu. ft. capacity digesters. All digesters are stainless steel clad. There are three large blow tanks that provide for maximum flexibility in permitting three different types of wood to be cooked and blown simultaneously.

The blown stock is then pumped by three 1400-gpm pumps to the stainless steel deknotter screens, which remove knots and long sprinters.

The washed pulp is thoroughly screened in stainless steel flat screens and in Cowan Mark A centrifugal screens. Washed and screened pulp is dewatered to a 3-4 per cent consistency and then stored in three large storage chests. A fourth storage chest handling the greatest production has a capacity of 65 tons at 4 per cent consistency. The exceptionally large size of these blending chests permits a more thorough blending of a number of digester charges, thereby insuring uniformity of quality through the bleach plant and on to the paper machine.

Pulp bleaching

A unique feature of Riegel's bleach system are the two bleach plants, each with two chlorine dioxide stages. The five-stage plant consists of chlorine bleaching, followed by caustic extraction, chlorine dioxide bleaching, followed by caustic extraction, followed by chlorine dioxide bleaching. The six-stage system is similar to the five-stage system with the exception that a hypochlorite bleaching stage follows after the first caustic extraction stage. Pulp brightness achieved in these bleaching systems is in the 88-90 per cent range.

Following each bleaching stage, pulp is washed in vacuum washers. The five-stage system has five 8- × 10-ft. vacuum washers, and the six-stage system has six 9½- × 12-ft. washers. Bleached pulp is stored in large 65-ton storage and blending chests that permit excellent agitation, mixing and blending of large quantities of stock.

Stock proportioning and refining

From the bleached storage chests stock is pumped to two stock chests: one for softwood and one for hardwood. A third stock chest is reserved for broke, which it receives from two 17-ft. diameter hydrapulpers and a 11½- × 16-ft. vacuum saveall.

Following each of the three stock chests there is a consistency regulator and a magnetic flow meter that are used in the stock proportioning system.

The stock from the broke chest is pumped through a breaker trap to the consistency regulator and magnetic flow meter. It is then joined by stock from the gum (hardwood) chest, which similarly was pumped through a consistency regulator and a magnetic flow meter and then introduced to the common reference flow line right ahead of the suction of a centrifugal pump that pumps stock from the pine chest. The mixed stock then passes through a third consistency regulator and totalling magnetic flow meter that measures total stock flow. The three flow meters are tied together so that they operate valves to maintain the proper proportion of the three components of the furnish.

The proportioning system is fully instrumented, so that the operator simply sets the dial on an instrument panel for the desired percentage of hardwood and broke in the furnish, and the instruments take over from there.

The refining equipment consists of eight Miami No. 5 jordans driven by 400-hp motors. The jordans are arranged in two groups: five in the primary group and three in the finishing group. The primary group does most of the hydrating and the bulk of the refining. The finishing group has narrower bars and is used to cut the fibers in a final treatment. The piping and valves connecting the jordans are so arranged that any one or any number of the jordans can be bypassed by simply turning a valve.

The jordans are of the pressurized type, operating under pressures as high as 85 psi. The pressure system in the jordans is a new development, intended to improve efficiency and result in other benefits in stock refining.

From the finishing jordans stock flows to the stuff gate, which is specially designed to permit accurate and reproducible settings. A constant pressure is applied to the stuff gate by maintaining a constant level of stock in the stuff box. The constant pressure together with accurate consistency control provided by the consistency regulators insures that a uniform weight of fiber is fed to the machine for any given gate setting. The setting is done either manually from a point near the wet end of the machine or automatically by the Accuray basis weight control instrument.

A 17,000-gpm fan pump driven by a 1250-hp motor receives the stock from the stuff box and pumps it through 29 Centri-Cleaners (25 in the primary position, three in the secondary position and one in the tertiary position), which are installed directly ahead of the paper machine headbox. The Centri-Cleaners in the primary and secondary positions are the No. 623-4 type with a capacity of 650 gpm each. The Centri-Cleaner in the tertiary position is of the No. 623 type.

All headers of the Centri-Cleaners are of 316 stainless steel and are tapered to maintain velocity. All accept

W. D. Harrison
Vice Pres. & Gen. Mgr. Production

C. E. Hartford
Vice Pres. & Gen. Mgr. Carolina Division

A. L. M. Bixler
Manager Paper Production

N. R. Phillips
Technical Director

C. Cline Peters
Plant Engineer

headers are sloped to prevent air accumulation.

All stock preparation, refining equipment and pumps are controlled from a single panel.

The paper machine

The paper machine features an inlet and pressure headbox of the latest design. A unique feature of the headbox is a device that indicates and records the position of the stream flow valve that controls stock consistency on the wire for any given speed and weight. This provides a record in terms of direct machine operating data, so that when a repeat run is made the machine tender can easily set up his machine to duplicate the conditions of any selected run desired. The headbox is further equipped with a pH meter that automatically controls alum addition at the stuff box.

Another unique feature of the fourdrinier is the length (157 1/3 ft.) of the 236-in. wide wire. The long wire has the advantage of (1) greater water removal capacity, (2) a greater degree of stock refining, resulting in better sheet properties, (3) the use of a larger quantity of water than is normally used at a given freeness, resulting in better formation without additional refining.

The couch roll is of the latest design, with holes drilled in a pattern commensurate with maximum noise reduction. The wire is driven from a wire-turning roll that follows the couch. The couch and three additional 24-in. wire return rolls are driven by helper drives. This wire drive arrangement has the advantage of improved wire life. White water from the couch pit is pumped by a 5000-gpm couch pit pump to the 11½- × 16-ft. vacuum saveall.

The press section consists of three presses — all of the latest modern design. The first press is a normal bottom roll suction press. The second press is an inverse press with the suction roll on top. This gives the effect of a reversing press but without complication of design or added expense. The third press is a hot press, located after the first six dryers on the machine. This is a recent arrangement for a third press in order to achieve better water removal and therefore increased production.

The press felts are provided with three of the newest design Vickery felt conditioners with hydraulic drive and traveling headers. Each felt conditioner is equipped with four vacuum shoes.

The dryer section has an unusually large number of drying cylinders — all of 5-ft. diameter. There are 72 paper dryers, 15 felt dryers, and eight coater dryers. The large number of dryers has the advantage of allowing the paper to dry more slowly, with the result that sheet quality is improved. The paper dryers are arranged in the following sections: (1) There are six dryers following the second press; (2) 18 dryers following the hot press; (3) 18 dryers preceding the breaker stack; (4) 19 dryers between the breaker stack and size press, and (5) 11 dryers following the size press.

The dryers are totally enclosed under a hood, complete with automatic lifting doors insulated aluminum roof and side curtains, exhaust fans and exhaust duct work. A unique feature of this hood is that it is separated at all the critical points, such as the third press and smoothing press, the breaker stack and the size press to make these easily accessible.

Another interesting feature of the dryer section is the installation of electric eyes so that a break anywhere inside the hood automatically raises large doors on the front side of the hood to permit quick and easy access to the point of trouble.

An on-the-machine air-knife coater of the latest design is equipped with high-velocity air-drying equipment consisting of supply fan, heating equipment and supply and recirculation duct work.

All coating formulations, as well as chemical additive mixtures applied on the calenders, size press, etc., are prepared in the Additives Area, which consists of seven stainless steel tanks and four stainless steel clad tanks — all equipped with "Ligthnin" mixers. The preparation of these coatings and additive mixtures, as well as the cooking of starch slurries, is controlled from a single control panel.

Starch and casein slurries are screened in a one-deck 48-in. diameter, stainless steel SECO separator equipped with a 100-mesh screen.

At the end of the drying section are two eight-roll calender stacks separated by an air-knife coater. Each calender stack is equipped with a 34-in. diameter king roll and seven 16-in. diameter intermediate rolls providing a nip pressure at the bottom roll of 478 psi. An outstanding feature is the equipping of the first calender stack with two stainless steel rolls in the water box position. This eliminates pitting or corrosion of the rolls in the water boxes. All 16-in. diameter calender rolls have 2-in. openings through the center for steam or cold water for either heating or cooling the rolls as may be desired.

Directly underneath the two calender stacks are two 17-ft. diameter hydrapulpers driven by 200-hp motors. The hydrapulpers receive trim or broke from the paper machine, reel, and winder. This is repulped and pumped back to the broke chest.

Following the last calender stack is a reel capable of winding rolls to a maximum diameter of 6 1/3 ft. When completely wound, the reel is transferred to a Model-L winder.

The machine drive is of the differential mechanical type consisting of a 2300-hp, 5755-rpm single-stage steam turbine (600-lb. steam feed, 50-lb. steam exhaust) as the prime mover, a line shaft rotating at 1000 rpm and a number of gear-boxes and in-shafts.

Moisture and basis weight control

Automatic moisture control instruments are installed at three places in the dryer section: one just ahead of

Principal equipment installed in connection with Riegel's new paper machine at Acme, N. C.

Engineering Contractor: J. E. Sirrine Co.

Wood yard operation

Bark Collector, 20 fpm, 3-cfm capacity	Link-Belt Co.
Belt conveyor, 18 in. wide	Link-Belt Co.
Belt conveyor, 72 in. wide for barked logs	Link-Belt Co.
Chain conveyor, 3-strand	Link-Belt Co.
Drag conveyor, 3.3-cfm capacity	Link-Belt Co.
Grit collector elevators, 3.3-cfm capacity	Link-Belt Co.
Pumps (2), 12,000-gpm, for flume water circulation	Goulds Pumps Inc.
Pulpwood unloader (Lorain)	Thew Shovel Co.
Pump 300-gpm on revolving disc screens	Goulds Pumps Inc.
Revolving disc screens (2), 12-ft. dia.	Link-Belt Co.
Rotary table feeder	Link-Belt Co.

Chip digestion and brown stock washing

Blow tanks	Gary Steel Products Corp.
Brown stock washers (9), four 8 × 10 ft., two 6½ × 14 ft., two 11½ × 14 ft., and one 9½ × 14 ft.	Improved Machinery Inc.
Cowan centrifugal screens, Mark A	Montague Machine Co.
Digesters (2), 3300-cu. ft. capacity	Chicago Bridge & Iron Co.
Pulp storage chests (4), 65-ton capacity at 4% consistency, tile construction	Stebbins Engineering & Mfg. Co.
Pumps, on blow tanks, 1400 gpm	Gould Pumps Inc., Ingersoll-Rand Co., Allis-Chalmers Mfg. Co.
Refiners (3),	Bauer Bros. Co. and Sprout-Waldron & Co. Inc.

Bleach plant

Bleach system	Improved Machinery Inc.
Bleach towers	Stebbins Engineering & Mfg. Co.
Blending chests, 65-ton capacity, for bleached stock	Stebbins Engineering & Mfg. Co.
Caustic extraction towers	Stebbins Engineering & Mfg. Co.
Chlorine dioxide generation system	Solvay Process Div. Allied Chemical & Dye Corp.
Instrumentation	Foxboro Co.
Magnetic flow meters	Foxboro Co.
Pumps	Allis-Chalmers Mfg. Co.
Washers (11), vacuum, five 8- × 10-ft. and six 9½- × 12-ft., used in five- and six-stage bleach systems	Improved Machinery Inc.

Stock proportioning and refining

Breaker trap, Sutherland,	Valley Iron Works Co.
Centri-Cleaners (29), No. 623-4 type, 650-gpm capacity, one No. 623 type, all equipped with 316 stainless steel headers	Bauer Bros. Co.
Consistency regulators	DeZurik Corp.
Fan pump, 17,000-gpm, driven by a 1250-hp GE motor	Black-Clawson Co.
Hydrapulper, 20-ft. dia., equipped with Link-Belt conveyor	Black-Clawson Co.
Instrumentation	Foxboro Co.
Instrumentation	Bailey Meter Co.
Jordans (8), Miami No. 5, pressurized type, driven by 400-hp GE motors	Black-Clawson Co.
Magnetic flow meters	Foxboro Co.
Motors	General Electric Co.
Pumps, stock	Black-Clawson Co.
Pumps, stock	Ingersoll-Rand Co.
Stock chests (3), pine, gum and broke	Stebbins Engineering & Mfg. Co.

Paper machine area

Air-heating system, including totally enclosed hood with automatic lifing and insulating aluminum doors, exhaust fans and duct work	J. O. Ross Engineering Corp.
Air-knife coater	John Waldron Corp.
Air-drying equipment on coater, consisting of supply fan, heating equipment, duct work	J. O. Ross Engineering Corp.
Calender stacks (2), 8 rolls each, with stainless steel rolls in water box	Beloit Iron Works
Couch roll	Beloit Iron Works
Dryer section, 98 cylinders, 5-ft. dia. each	Beloit Iron Works
Felt conditioners (3), Vickery, with hydraulic drive and traveling headers; each with four vacuum boxes	Bird Machine Co.
Fourdrinier, with 236-in. wide, 157 1/3-ft. long wire	Beloit Iron Works
Headbox, pressurized, with indicating and recording stream flow valve	Beloit Iron Works
Hydrapulpers (2), 17-ft. dia., driven by 200-hp GE motors	Black-Clawson Co.
Instrumentation	Foxboro Co.
Breaker stack	Beloit Iron Works
Mixers (11), "Lightnin", in additives area	Mixing Equipment Co. Inc.
Motors	General Electric Co.
pH meter on headbox	Beckman Instrument Co.
Press section, 3 presses (1st, 2nd inverse presses and hot press)	Beloit Iron Works
Pump, 500-gpm, on couch pit	Ingersoll-Rand Co.
Pumps, chemical	Allis-Chalmers Mfg. Co., Duriron Co. Inc., Ingersoll-Rand Co., Robbins & Meyers Inc., Viking Pump Co., Worthington Corp.
Pumps, stock	Black-Clawson Co.
Paper machine drive, mechanical differential	Beloit Iron Works
Reel, 6½-ft. rolls	Beloit Iron Works
Roll set kicker	Beloit Iron Works
Rotameters on filler tanks	Fischer & Porter Co.
Saveall, 11½ × 16-ft. vacuum	Improved Machinery Inc.
Screen, 1-deck, 48-in., dia. for screening starch and casein slurries	Southwestern Engineering Co.
Size press	Beloit Iron Works
Steam turbine, 2300-hp, on machine drive	General Electric Co.
Stripping conveyor	Beloit Iron Works
Stainless steel tanks (11), in additives area	Gary Steel Products Corp.
Stuff box	DeZurik Corp.
Winder, Model L	Beloit Iron Works

Moisture and basis weight control

Accuray system, with two recorders and automatic controller	Industrial Nucleonics Corp.
Automatic moisture control, in three places on dryer section	Foxboro Co.

Dryer steam control and drainage system

Condensate pumps (8)	Ingersoll-Rand Co.
Steam control and drainage system, cascade dual type	Ross Midwest Fulton Corp.

Vacuum system and air compressors

Air compressors (2), one 10 × 11 ES and one 18½ and 11½ × 8½ XLE	Ingersoll-Rand Co.
Motors (7), 50-400 hp	General Electric Co.
Vacuum pumps (5), two compound RCV-2 and three single-stage RCV	Roots-Connersville Blower Corp.
Vacuum pump	Nash Engineering Co.

Roll finishing and handling system

Cutter and layboy, high-speed, 136-in. Type "H" Simplex	Clark-Aiken Co.
Roll finishing and handling system, complete with sorting deck, sorting conveyor, rotating wrapping drums, heading machine, scale feed conveyor, lowerator and automatic control	Lamb-Grays Harbor Co. Inc.
Trimmer, 100-in., fully automatic spacer	Harris-Seybold Co.
Winder and shaftless backstand, 92-in., 2000 fpm	Samuel M. Langston Co.
Winder drive, Speed Variator design	General Electric Co.

Steam plant

Steam generating unit, 200,000-lb./hr. capacity at 600 psi	Combustion Engineering Inc.
Combustion controls	Bailey Meter Co.
Feed water controls, three-element type	Bailey Meter Co.
Oxygen analyzer	Bailey Meter Co.
Steam flow meter	Bailey Meter Co.
Steam pressure controller	Bailey Meter Co.
Steam temperature controls	Bailey Meter Co.

Water supply

Chlorinators	Fischer & Porter Co.
Flocculation and filtration	Roberts Filter Mfg. Co.
Pumps (3), 16-in., 5750-gpm turbine type, for raw water pumping (previously installed)	Layne-Atlantic Co.
Pumps (2), 10,000-gpm, for raw water pumping	Byron Jackson Pumps Inc.

Pumps (3), 5500-gpm centrifugal, on mill water service ..... Worthington Corp.
Pump (1), 9000-gpm centrifugal, on mill water service ..... Ingersoll-Rand Co.
Pumps, chemical, 200-gpm positive displacement .... Milton Roy Co.

General

Cranes and hoists ..... Euclid Crane & Hoist Co., Northern Engineering Works, American Chain & Cable Co. Inc., Manning, Maxwell & Moore Inc., R. G. LeTourneau Inc.
Electric hoist, 20MT10-1930 type, 20-ton capacity, two lift speeds of 10 and 19 fpm, equipped with inching control ..... R. G. LeTourneau Inc.
Fans ..... American Blower Corp., Westinghouse Electric Corp. (Sturtevant Div.)
Filters ..... American Air Filter Co. Inc.
Lift trucks ..... A. E. Finley & Associates, Towmotor Corp., Clark Equipment Co., Industrial Truck Sales & Service Inc.
Motors and motor controls ..... General Electric Co.
Platform lift ..... Southworth Machine Co.
Scales ..... Fairbanks, Morse & Co.
Size emulsifier ..... Hercules Powder Co.
Unit substations ..... General Electric Co.
Valves, control ..... The Foxboro Co., DeZurik Corp., Fischer-Governor Co.

the size press, one just ahead of the first calender and one just ahead of the reel. Either of these three stations can be made to control the moisture content of the sheet.

An Accuray system controls basis weight by means of a backscatter type measurement at the last bottom dryer roll ahead of the first calender stack.

The controls associated with the Accuray system are located in a console on the flying bridge opposite the headbox. This console continuously records the basis weight picture of the sheet as the measuring head scans from one side to the other. A second recorder is located at the dry end of the paper machine to enable the back tender to observe basis weight of the sheet as it is being made. Over-all control of basis weight is accomplished by the Accuray automatic controller. The automatic controller receives signals from the computing equipment at the end of each scan across the sheet and converts this information into electrical signals to the stock valve to maintain basis weight at the dry end at specification.

The Accuray system incorporates a self-monitoring provision so that, if for some reason the system is no longer capable of performing an accurate measurement, the complete system will retract from the sheet, shut itself off and sound an alarm to warn the operator to change to manual control.

Dryer steam control and drainage system

The dryer drainage and steam control system is of the cascade type, operating in five sections and capable of using 150 psi or 50 psi steam pressures. The system includes eight separators, two vacuum receivers and two vacuum condensers.

Supplemented by the two previously described moisture controllers, the steam control and drainage system provides independent automatic temperature control of the different dryer sections.

During paper breaks steam pressure is automatically lowered to a predetermined setting. Special controls are also provided to eliminate curl.

Vacuum system and air compressor system

Vacuum for the couch, suction boxes, suction presses, and Vickery felt conditioners is provided by five vacuum units. These include three compound units: (1) A size 20 × 45 — 16 × 36 compound type RCV-2 driven by a 400-hp motor and supplying vacuum for the couch, and (2) a size 16 × 36 — 14 × 24 compound type RCV-2 driven by a 300-hp motor providing vacuum for the first press. These two units handle a total of 15,500 cfm providing a vacuum of 20 in. Hg.

Three single-stage type RCV pumps, (1) a size 16 × 36 on the second press, (2) a size 14 × 24 on the suction boxes, and (3) a size 10 × 25 on the felt conditioners, handle a total of 9000 cfm providing a vacuum of 10-15 in. Hg.

Compressed air for instruments and mill use is provided by two air compressors: a 10 × 11 E S compressor driven by a 50-hp motor and an 18½ and 11½ × 8½ XLE compressor driven by a 200-hp motor.

Roll finishing and handling system

The equipment in the finishing area consists of a 92-in. rewinder and shaftless backstand; a 100-in. fully automatic trimmer featuring automatic spacer and full hydraulic operation of the knife, clamp and back gauge; a baler; a high-speed 136-in. Simplex cutter with backstand and layboy, and roll finishing and handling system.

The 92-in. 2000-fpm winder and shaftless backstand features a new hydraulic rider roll control system to achieve better density control. The winder is equipped with Vari-pitch sheave drive on the main drums, a rider roll (V belt-driven from the front winding drums), a hydraulic rider roll control with automatic lifting, automatic roll ejector, a rotating expander roll and a leaf-type pneumatic collapsible rewind shaft.

The winder drive is a new design Speed-Variator utilizing a 100-hp motor. The drive features controlled acceleration, independently adjustable thread and jog down to 5-100 fpm, a pre-set speed control and pneumatic braking with a constant tension device.

In the roll finishing and handling system at the end of the paper machine, sets of rolls are pushed off the stripping conveyor by a roll set kicker to a sorting deck. Thirteen roll stops, located at the foot of the sorting deck, serve to separate and feed any combination of rolls to the sorting conveyor, which is designed to route the rolls two ways. Rolls that do not require wrapping may be immediately discharged to the hydraulic arm lowerator, while rolls that require wrapping are advanced by the conveyor to the storage ramp, where a section of the conveyor "tilts" and discharges the roll automatically to the ramp.

From the ramp, rolls are fed by pushbutton control to rotating wrapping drums equipped with overhead wrapper dispenser. When the required number of wraps are on the roll, the cut-off mechanism shears the sheet and re-sets the dispenser so that any of five different wrappers are immediately available for the next roll. The wrapper selection and cut-off mechanism are pushbutton-operated. The tail of the wrapper is then secured and inside heads inserted in both ends. While the operators are crimping the wrapper over the end of the roll, the head gluer automatically delivers the required amount of adhesive on the outside heads.

The header vacuum system is then energized to hold the glued heads in place on the heated platens of the heading machine as the roll is discharged from the wrapping rolls to the heading machine. A pushbutton then energizes the automatic heading

(Continued on Page 498)

Radio—an essential tool of forestry*

ROBERT W. OLIN
Director of Planning
Potlatch Forests Inc.

The use of radio has become essential in such emergency situations as quick medical aid to the injured, effective fire fighting, logging operations, logging equipment maintenance, etc.

THE USE of radio is not simply a matter of buying radio apparatus that is adequate for the job. The first requirement is to gain the privilege of using specific radio channels, which are part of the public resource. Channel space is available for about one in five who wish to use radio, depending on whether proof of public interest, convenience and necessity can be shown to the administering agency—the Federal Communications Commission (FCC).

The national executive committee of radio-using members of the forest industries is called Forest Industries Radio Communication (FIRC). The committee guides the day-by-day contact between forest industry members and the FCC. The entire engineering detail of assigning a mobile radio channel to any particular logger or industry user must clear through a division office of FIRC before the Federal Communications Commission considers the applicant's request for a radio station license. This office maintains all of the license records and engineering data for every private forest industry radio system in the United States.

Forest industry radio uses

The many favorable and useful applications of mobile radio are limited by the ingenuity of the loggers. Of first importance is that of gaining assistance for those who are injured or lost in the forests. Roads are cleared for ambulances or for emergency runs by doctors. Airplanes are frequently called to transport injured persons to hospitals. It is estimated that at least 10 lives are saved every year in industrial forests due to the time gained through rapid communications by mobile radio.

Second, primary use is being made of radio in fire protection work. Fires can be detected, but unless adequate help can reach the fire quickly the loss can be great. Mobile radio plays two parts, first it sounds the alarm of those detecting the fire and measuring its severity. Next it mobilizes men, machines and transportation to subdue and control the fire. It mobilizes supplies and reserve equipment to back up the first line of fire defense.

Apart from these emergency uses there is the routine business of tree farming and logging. Machine breakdowns and repairs are a constant source of emergency. Direction of crews and shifting of machines from one area to another are accomplished by one supervisor working from his car or pickup in the area, even though he may never reach the site where the changes occur. Routine administrative matters and procurement of necessary parts and supplies take the last place in the category of priorities but aid tremendously in justifying the cost of mobile radio systems.

Radio equipment

Mobile radio systems vary greatly in complexity. Usually there is a home or base station, which may be located at a general office, headquarters or mill. Most mobile radio is a line-of-sight type of signal transmission. Frequently the base station antenna must be located high on a tower or on a hilltop near the headquarters office with land wire connection to the office. Another radio system—a control radio—that replaces the land wires is used where land wires are too expensive. Large systems may require several base stations to adequately cover the logging operation, and in many instances these base stations are tied together by means of secondary radio channels assigned for that specific base station-to-base station use. Normally, our radio service is a mobile service that restricts base stations to communications with mobile units or communications between mobile units. Mobile radios can be installed in any battery-powered vehicle. Low-power mobiles called pack-sets carry their own battery power in dry or re-chargeable carry-type batteries. Range of communications is controlled by many factors, but the usual distance is 10 to 25 miles from the base station, although there are many exceptions and qualifications to this figure. Some radios are installed in log trucks, in log-loading machines or may be set up as temporary base stations with a mobile gasoline engine-driven power plant to power them. On rivers where logs are boomed, the loggers can use forest industry radio to control a boat's operations. Airplanes that are used for fire detection or other forestry purposes can also be so equipped.

Radio costs

The average mobile radio costs between $500 and $600 installed in a car or truck. The simple base station with its antenna and necessary equipment will run between $1,000 and $1,500. This base station price will be increased when it is remotely-controlled on some mountain top where weather conditions demand better housing facilities. Low-power short-range hand-packed battery sets may be purchased for as low as $300. Such pack-sets are invaluable on fire lines. Maintenance costs vary greatly with the local availability and capabilities of FCC-licensed technicians that are required. It may range anywhere from $5.00 to $20.00 per set per month depending on type of service and equipment, with an average of about $12.00 per set per month. Many firms report that the savings on a single emergency or situation have frequently paid for the entire radio system in one experience.

*Abridged from a paper presented at the 12th national meeting of the Forests Products Research Society.

The use of pipe, fittings, pumps and valves in the pulp and paper industry

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Vice President, Eastern Engineering Co.

Part V—Application of pipe, fittings, valves and pumps in water supply and treatment and waste disposal

SINCE THE PULP AND paper industry is one of the largest industrial users of water and generators of waste, it is constantly aware of the problems that arise in these services.

Although locating a reliable source of water of satisfactory quality and quantity is an ever-increasing problem for this expanding industry, the handling and treatment of mill water presents few problems that cannot be economically solved by established methods. This is not true of the problem created by mill wastes.

In the past waste disposal was handled by the simple expediency of dumping. This dumping depended almost entirely upon nature for disposal. Actually, very little equipment or piping was used. This was true of all industrial wastes, not just those from pulp and paper mills.

The dumping of waste is still done to some extent, but more and more waste treatment is being attempted. Some progress is being made in paper mill waste treatment, but no economical effective treatment system has yet been devised.

However, any treatment method that will be devised will almost certainly require considerable quantities of piping and pumps, and an understanding of materials available for this service will be helpful.

Water supply and treatment

Water for pulp and paper mills is obtained from rivers, wells and lakes and always requires piping and generally requires pumps.

River and lake water almost always requires some form of treatment to make it suitable for use. Frequently well water can be used without any treatment.

Raw river or lake water is usually collected at a pumping station and pumped to a treatment plant. Well water must be collected from several wells by a network of pipelines that cover the well field. Depending upon the underground water supply and the quantity needed, this network may contain several miles of pipe. In cases where further treatment is required, the well water network conveys the water to a treatment plant.

Except for the source and method of collection, the piping of water to the treatment plant from wells or river and lake is a similar problem.

The piping materials used are dictated by the condition of the water. Cast iron, asbestos cement, wrought iron, carbon steel, wood stave, reinforced concrete, wood-lined steel and coated and wrapped carbon steel have all been successfully used.

The piping is installed both above and below ground. Underground installations are usually more satisfactory, but local conditions may make it undesirable or uneconomical to bury the piping.

In either case, piping should be adequately supported and anchored. More piping failures are due to inadequate support and anchorage than to defective materials, mechanical damage or corrosion.

The piping within the treatment plant and that conveying the finished water to the mill is similar to the raw water piping.

Pumps, piping and valves for water supply service should be selected for continuous operation for long periods between shutdowns. A component that might require frequent outage for repair and maintenance has no place in water supply service. Although the service conditions are not severe, the service must be maintained without interruption or curtailment.

In the treatment of raw water a number of different chemicals may be added to give the finished water the desired quality. The particular chemicals and the quantity of each used is a function of the condition of the raw water and the desired quality of the finished water.

Of the numerous chemicals used, chlorine, alum and hypochlorite are probably the most corrosive. Chlorine in liquid or gaseous form is not corrosive on carbon steel so long as it is kept dry. When it is allowed to pick up moisture or when it is dissolved in water at any appreciable concentration, it becomes very corrosive. When wet chlorine is to be handled, lead, Saran, polyvinyl chloride, rubber, hastelloy, titanium or other materials more expensive than carbon steel must be used. More will be said about chlorine and hypochlorite piping in a later article on the handling of bleaching chemicals. Alum piping will be covered in a later article on stock preparation; but rubber, Saran, polyvinyl chloride, lead and Duriron are materials that are used for piping, valves and pumps.

The lime, caustic, soda ash and sodium aluminate used in various types of water treatment can all be handled in cast iron or steel piping, valves and pumps. Valves and pumps for these services should be all iron or all steel or iron or steel with stainless steel trim. No brass or bronze trim should be used for valves or pumps handling these materials.

Waste disposal

The effluent from pulp and paper mills is composed of the following: (1) process wastes, (2) sanitary wastes and (3) storm drainage (not a mill effluent, but a drainage product that must be conveyed away from the plant site).

Process wastes originate in the pulp mill, chemical areas, paper mill, water treatment area, bleach plant and power plant. The waste from the water treatment area is usually not toxic and requires no treatment prior to disposal (except for lime sludge from some processes). These wastes usually flow by gravity and require no pumping. The piping materials used may be the same as used for water supply, or con-

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New supercalender in operation at Eastman Kodak's film department

A. W. J. DYCK

Over-all view of B. F. Perkins supercalender—also showing the three-arm reel, reel drive and console panel.

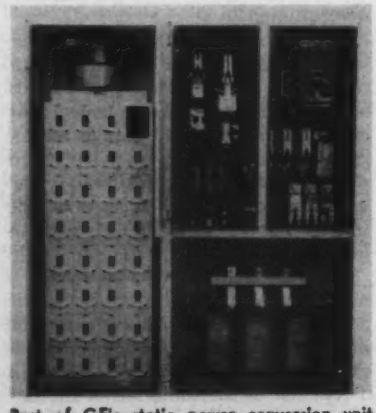
The B. F. Perkins supercalender installed at Eastman Kodak and incorporating many new features enables the company to produce a backing paper at higher speeds and with greater uniformity in thickness and smoothness.

IT WAS GEORGE EASTMAN'S belief that his company would prosper and gain stature only as it looked ahead scientifically. The 80-year period of Eastman Kodak Co.'s success story, during which it has managed to erect nine manufacturing plants in the United States, is adequate proof that the company has continued to look ahead scientifically. It has done so in matters that affect quality and precision output of its products as well as in its industrial relations program, which has culminated in a unique and well-functioning employee benefits program and wage dividend plan.

The principle of looking ahead, scientifically, also entered in the acquisition of a new supercalender by Kodak's film organization. Much scientific research and engineering has gone into the development of the B. F. Perkins & Sons Inc. supercalender that now possesses the high performance characteristics demanded by Eastman Kodak for its output of quality products. The same applies to the development by General Electric Co. of the unique supercalender drive, which is energized by a 150-hp static power supply system.

The new 50-in. supercalender adds substantially to the productivity of the Roll Film Div. Apart from imparting a higher gloss, compactness and improved smoothness to the roll film backing paper, it is also expected to eliminate the moisture conditioning step that has been in use to raise the moisture content of paper to 8-9 per cent prior to supercalendering.

Eastman Kodak manufactures about 100 tons of paper daily at its Rochester, N. Y. mill for various applications in the manufacture of photographic papers. For this purpose the company uses specially processed high-quality bleached sulfate pulp, which is currently procured from Brown Co., Canadian International Paper Co., St. Regis Paper Co. and Weyerhaeuser Timber Co.



Part of GE's static power conversion unit featuring a three-phase double-way rectifier and hermetically-sealed silicon rectifiers (left).

The supercalender

The 50-in. wide supercalender is equipped with a 20-in. diameter chilled iron top roll, four 18-in. diameter cotton rolls, three 10-in. diameter chilled iron intermediate rolls and a 22-in. diameter chilled iron bottom roll.

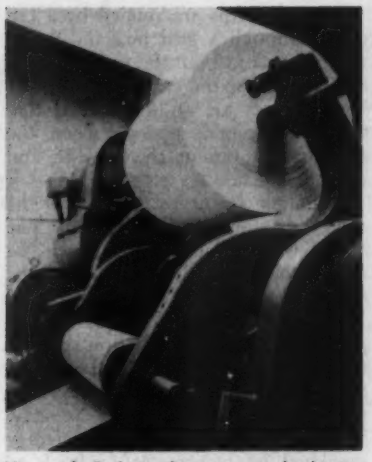
All chilled iron rolls are chrome plated. The cotton rolls have a hardness of 92 (for N.P. cotton rolls) and a hardness of 85 (for long-fibered carded cotton rolls) on the Durometer "D" scale. The intermediate rolls are steam-heated to 212°F by exhausting steam into them at atmospheric pressure from a 5-psi steam line.

Frames. The frames are heavy box scetions of reinforced welded steel, carefully annealed and machined to close tolerances. The four frames are mounted on two heavy steel base plates, providing a large area of contact on the concrete foundations. Each frame has a tee slot running the full height on the inside face to provide means for fastening fly rolls, adjustable platforms, spreader rolls and other calender accessories.

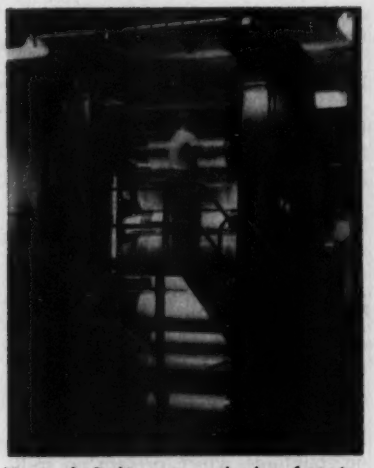
Heavy steel caps and large steel tie bars hold the frames together at the top. The frame gaps are wide enough to allow any roll to be removed endwise.

All lubrication, steam, water and air lines are concealed in the frames, providing increased safety. Doorways

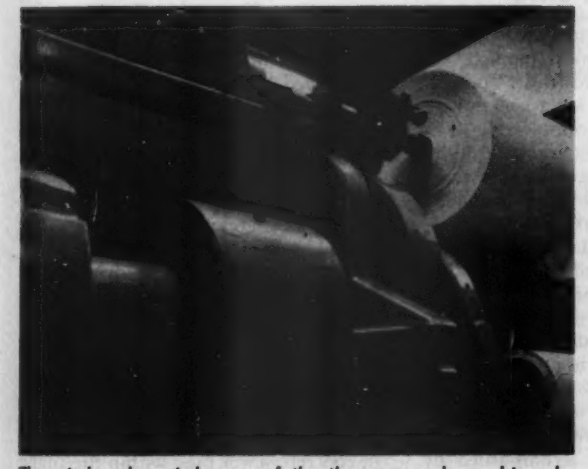
Heavy supercalender frames conceal all lubrication, steam, water and air lines.



View of Perkins three-arm reel showing wind and unwind cores.

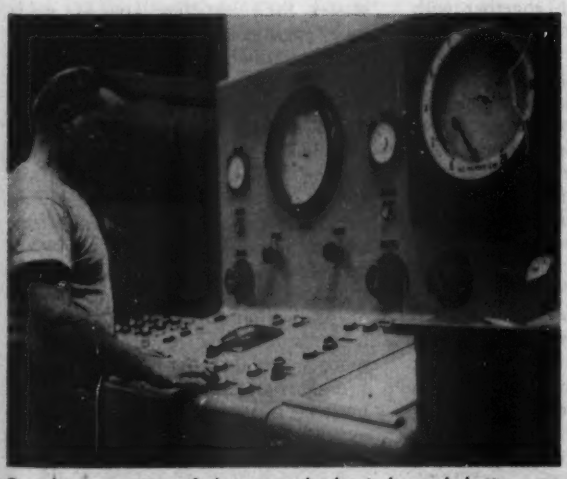


View of Perkins supercalender featuring five chilled iron rolls and three cotton rolls.

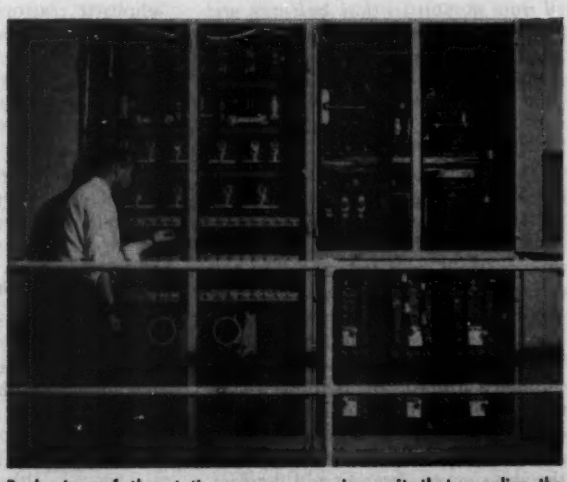


The wind and unwind cores of the three-arm reel are driven by 10-hp GE motors.

A 150-hp GE motor, connected to the bottom roll by a silent chain drive, drives the supercalender.



Complete operation of the supercalender is by push button controls from a Foxboro console panel.



Back view of the static power conversion unit that supplies the 150-hp motor.

at the bottom of the frames make these lines readily accessible.

Bearings. All bearings are Timken type roller bearings. They are mounted in enclosed housings with labyrinth type seals to prevent any oil leakage. There is absolutely no rubbing contact on the roll journals.

The bearings are continuously lubricated by means of a circulating oil system with a 75-gal. water-cooled oil reservoir and a filtering system on the pressure and return side of the pump. The oil is pumped to two manifolds at the top of the frames and is then fed through adjustable sight feed gauges to each bearing.

The oil lines connect to the bearing housings by means of self-sealed snap-on couplings, which prevent oil spillage when changing rolls. A low-pressure alarm warns the operator should the oil pressure fall below a predetermined setting.

The supercalender is designed for operation at pressures from 0-2500 lb. per linear inch and for speeds of 0-1600 fpm. It is driven by a 150-hp motor connected to the bottom roll by a silent chain drive.

Pressure. Pressure to the rolls is applied by two air cylinders acting through levers mounted in the top caps. A 24-hr. recording chart gives instantaneous readings and a permanent record of the pressure used on both sides of the calender.

The rolls are lifted, lowered and held apart by means of a motor-driven roll-lifting device. Automatic controls stop the motor at both extremes. Safety controls are incorporated, preventing pressure from being applied while the rolls are separated.

Fly rolls. Eight chrome-plated fly rolls and one chrome-plated guide roll complete with universal mounting stands are also included with the calender. These fly rolls and guide rolls all run in anti-friction bearings and are dynamically balanced. A Mount Hope Machinery Co. expander spreads the paper before the first nip.

Reel and reel drive

The supercalender is served by a three-arm reel equipped with two 10-hp dc motors on the wind and unwind cores, to which they are connected through Falk gear reducers. The two GE 10-hp drives features a memory rheostat tension control system including static-amplistat tension regulators. The drives are compensated to give improved control of tension over a wide speed and build-up range and include special inertia compensation that automatically adjusts the tension of the sheet on acceleration and deceleration.

The reel arms are rotated by a GE motor through a gear box and under no circumstances can the weight of the mill rolls cause the reel arms to move. The controls are so interlocked that the motor cannot operate when the arm locking pin or the unwind and rewind clutches are engaged.

A unique feature of the reel is the axial adjustment of the arms. The arms, with their bearings, can be moved to allow full utilization of the filled roll faces.

The complete operation of the supercalender is by push button controls from a conveniently-located console panel that also records nip pressure, roll temperature and sheet velocity. The speed of the supercalender is regulated by tachometer feedback to an amplistat regulator. Provision for static electricity removal from the sheet is by means of two grounded copper-wire brushes.

The supercalender drive

The General Electric main supercalender drive (a more complete description of the supercalender and reel drives will appear in a subsequent issue) includes a completely static power conversion unit for the 150-hp motor, with static regulator and static tension regulators. This is a completely novel feature, eliminating all moving parts and associated routine maintenance. It is believed that this static power conversion unit is the first of its kind in the pulp and paper industry and the largest unit in existence.

The static power unit supplies the 150-hp motor with controlled and regulated dc power from the mill's 480-v, three-phase 60-cycle bus. Dc power conversion is accomplished by a three-phase double-way rectifier and hermetically-sealed silicon rectifiers. Power output and supercalender speed control is achieved by controllable amplistat reactors that, together with the silicon rectifiers, form a magnetic amplifier.

The static power supply system has 32 silicon rectifier units separately enclosed in draw-out compartments for easy replacement. Each unit has a fast-acting circuit breaker that functions as a local protection for the rectifiers as well as protection for the main drive.

Function of the supercalender

The function of the new supercalender in Kodak's Film Div. is to impart such properties as smoothness and gloss to a sheet of paper used in the manufacture of roll film backing papers.

After supercalendering, the sheet receives a yellow coating and black ink to show exposure numbers, followed by colored ink for the ends.

Following this operation, the other side is given a black opaque coating.

With the new supercalender, Kodak is now producing, at higher speeds than previously possible, a paper base for roll film backing paper that is more uniform in thickness and smoothness.

Pipe, fittings, valves and pumps

(Continued from Page 445)

crete or vitrified clay sewer pipe may be used where the wastes are not discharged under pressure.

Power plant wastes are also nontoxic except effluent from some of the boiler feed water treatment systems and from the recovery unit and liquor evaporators where these are used. The non-toxic effluent may be handled in the same manner as the water treatment waste. The toxic effluent may be handled in the same manner as the pulp mill and bleach plant wastes as mentioned below.

The bleach plant and chemical area wastes are toxic and corrosive. They are usually handled by gravity and in vitrified clay pipe.

The pulp and paper mill wastes are also usually gravity flow and may be handled in concrete sewer pipe.

The handling of sanitary waste is usually done in cast iron or vitrified clay pipe. Each state usually has a code that sets forth the minimum legal requirements for sanitary waste systems, and these should be consulted to assure compliance.

Storm drainage is usually handled in concrete sewer pipe within the plant area and in open ditches from the plant area to the point of disposal.

Most states have enacted laws to govern the disposal of industrial wastes. Each year these laws are made more stringent. They require more waste treatment than is currently being done by most industrial plants but usually provide a reasonable time in which to comply. They are aimed at reducing polution and thereby conserving natural resources such as water. In complying, industry directly reduces polution of the raw water supply and indirectly makes the raw water supply serve more industry by reducing the water used in relation to a unit of production. It is obvious that the more water used in processing, the more waste that must be treated before disposal; and the more waste that must be treated, the larger the capital expenditure required to comply with the law. The reuse of water in pulp and paper mills reduces both the water supply and waste disposal costs.

Groundwood and chemigroundwood from European poplar wood*

W. BRECHT
Institute of Paper Technology
Technical University Darmstadt

PRETREATMENT			METH. No.	CONDITIONS OF THE PRETREATMENT	METH. OF
WITHOUT PRETR.			0	BASIS OF THE COMPARISON	
MILD PRETR.		BOILING	1	1/2hr EVAC., 5hr BOILING (NORMAL WATER) AT 71 psi AND 120°C, 1/2 hr. COOLING WITH WATER	
		STEAMING	2	1/2hr EVAC., 2 1/2 hr. STEAMING AT 57 psi AND 152°C, 1/2 hr COOLING WITH WATER	
	CHEMICAL PRETREATMENT	COOKING	3	1/2hr EVAC., 3hr COOKING WITH SOLUTION OF 45 g SO_2 + 9 g CaO / l AT 57 psi AND 110°C, 1/2 hr. COOLING WITH WATER	
		COMBINED METHOD	4	15hr DRYING IN AIR (105°C), 5hr. IMPREGNATING WITH SOLUTION OF 60 g $NaHSO_3$ / l AT 60°C AND ATMOSPH. PRESSURE, 3 hr. STEAMING AT 43 psi AND 143°C, 2hr TREATMENT WITH WATER (80°C), 1hr. COOLING WITH WATER	WEISS-HUHN (LIGNO-ZELL)
STRONG PRETR.		COOKING	5	1/2hr EVAC., 6 hr. COOKING WITH SOLUTION OF 143 g Na_2SO_3 + 32 g $NaHCO_3$ / l AT 200 psi AND 150°C, 1/2 hr. COOLING WITH WATER	LIBBY-O'NEIL
INST. OF PAP-TECHN. DARMSTADT				METHODS OF WOOD-PRETREATMENT	

Fig. 1—Methods of pretreatments.

▶ Using the Libby-O'Neil method of pretreatment, it is possible to produce poplar chemigroundwoods that are stronger than normal spruce groundwood and also stronger than birch and beech chemigroundwood.

POPLAR IS ONE OF the fastest growing trees in Europe. In Italy young seedlings are well cared for for two years in nurseries and then transplanted into the field. A ten-year growth of such seedlings has produced yields as high as 25-45 cords per acre.

In a study conducted by the Institute of Paper Technology a number of different pre-treatments were used on 30-in. long logs of spruce, poplar, birch and beech. Details of the methods of pre-treatment are shown in Fig. 1.

The wood pre-treatment was carried out in an experimental digester of stainless steel holding about 50 U.S. gallons. After the pre-treatment the logs were cut to 10-in. lengths.

In subsequent grinding the same working conditions were observed in each case, i.e., a grinding pressure of 14 psi, a circumferential speed of the grindstone of 44 fps, a temperature in the pit of 55° C and a consistency of 1.8 per cent.

Experimental results

Fig. 2 shows the specific energy consumption for grinding expressed in kWh per weight unit of oven-dry groundwood. As may be seen, the untreated poplar requires less energy than spruce but a little more than birch and beech. The grinding of pre-treated poplar required more energy with the mild pre-treatments. In Method 5, however, the energy requirement dropped from 78 kWh for normal grinding to 71 kWh, showing a saving in energy of almost 10 per cent.

The brightness of the groundwoods as measured with the apparatus "ELREPHO" (made by Zeiss), and using magnesium oxide as a reference basis, is shown at the bottom of Fig. 2. In the treated group, poplar groundwood was brighter than that of birch and beech but slightly darker than spruce groundwood. In all methods of wood pre-treatment, poplar groundwood showed the greatest brightness almost throughout. It can be seen that in Methods 1 and 2 and especially in Method 2 there was a loss in brightness. It is interesting to note that the chemical pre-treatments not only showed no loss in brightness but actually an improvement in Methods 3 and 4 when compared to the pre-treatment Methods 1 and 2. Poplar groundwoods, as may be seen, approached in brightness that of the mechanical groundwood of untreated spruce. This did not prove to be true for chemical birch and beech groundwoods, although there occurred considerable gains in brightness in Methods 3, 4 and 5.

Fig. 3 shows that the percentage of long fibers in normal groundwood of spruce amounted to 18 per cent, giving a total value for long and short fibers of 53 per cent. Normal groundwood of poplar, although better than that of birch and beech groundwoods, shows a less favorable percentage of long fiber content. The pre-treated poplar wood showed an improved long fiber content. In Method 5, with long fibers of about 40 per cent and a total amount of fibrous material of 76 per cent, the poplar stock actually did not resemble a true groundwood any longer. The beech groundwoods did not show much of an improvement, while in birch only the strong pre-treatment, i.e. Method 5, leads toward a clear improvement.

Fig. 4 shows improvements in tear resistance obtained as a result of the pre-treatments. It can be seen, however, that all hardwood groundwoods are inferior to spruce groundwood. Again poplar wood yielded far better results than the two other groundwoods. While beech wood in in the most favorable case, namely in Method 5, gives almost the tear resistance of mechanical spruce groundwood, poplar wood resulted in higher values in Methods 4 and 5. For birch the results were similar to those of beech.

The folding endurance for poplar pulp obtained in Method 5, shown

*Abridged from a paper presented at the 3rd International Fundamental Research Symposium, jointly sponsored by the Technical Section of the Canadian Pulp & Paper Association and the Technical Association of the Pulp & Paper Industry.

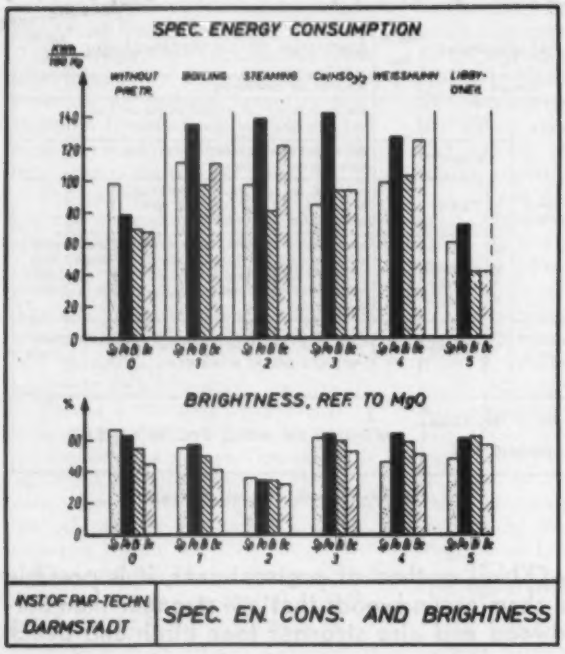


Fig. 2—Specific energy consumption and brightness of pulps.

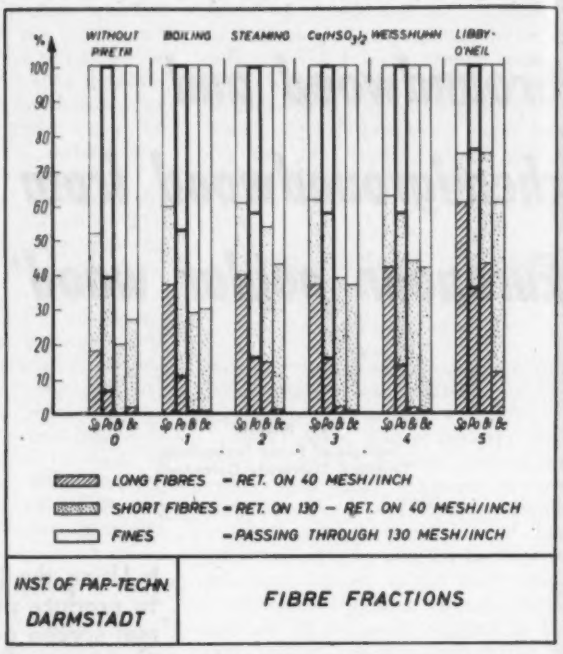


Fig. 3—Fiber lengths of pulps obtained by the six methods.

in Fig. 4, with a value of 2850 is excellent. Also, the folding endurance of birch and even beech groundwoods surpassed by far that of normal spruce groundwood. Similar improved results were obtained with pre-treated hardwoods for the tensile and wet web strengths (Fig. 5.)

The monosulfite poplar groundwood obtained in Method 5 with a tensile strength of 8600 m represents something completely new. In the case of the wet web strength, all hardwood groundwoods showed comparatively high values, though they were much freer than normal spruce groundwood.

It follows from the results that for poplar wood chemical pre-treatment is of particular significance. It is possible to produce poplar chemigroundwoods that are stronger than normal spruce groundwood and also stronger than birch and beech chemi-

(Continued on Page 498)

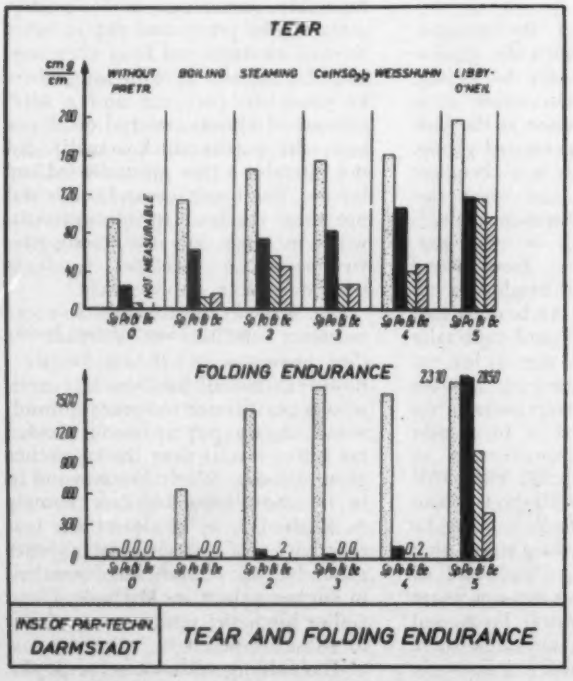


Fig. 4—Tear resistance and folding endurance.

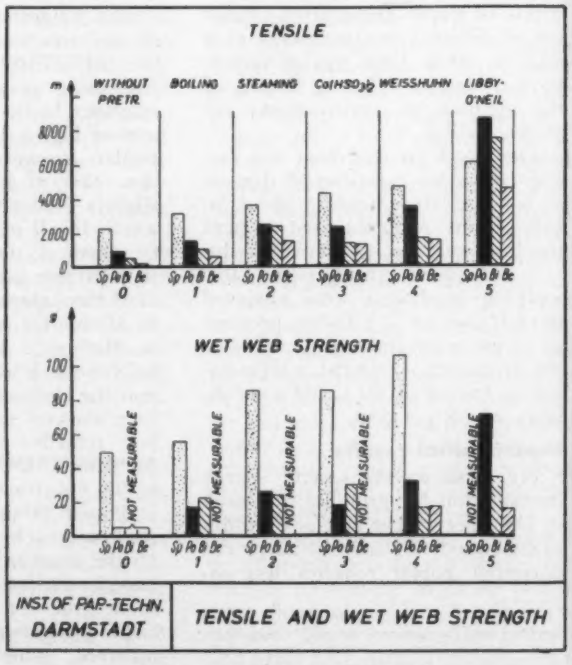
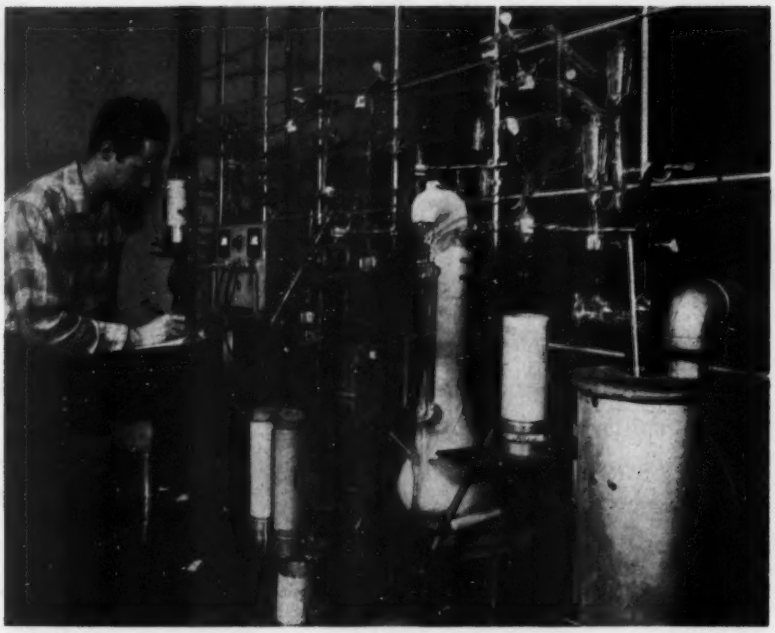


Fig. 5—Tensile and wet web strength.

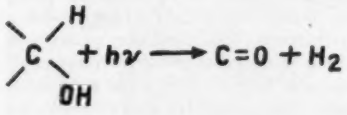
Degradation of cellulose by ultraviolet light



Scientist takes pressure readings from a thermal conductivity gage on the left. On the extreme right is the cylindrical aluminum reflector containing the reaction vessel and irradiation apparatus.

TO PROVIDE BASIC information on the properties of paper, the National Bureau of Standards is investigating the primary processes that occur when cellulose molecules are broken down by ultraviolet light. In recent experiments the rate of evolution of gaseous products during exposure was measured. The results indicate that the main reaction in the far ultraviolet region is the decomposition of the alcohol groups in the cellulose to produce carbonyl groups as hydrogen gas is evolved.* Data from these experiments should be of considerable value in determining more desirable conditions for the preservation and storage of records and the display of historical documents.

In the present study, which was carried out by Bureau scientists J. H. Flynn, W. K. Wilson and W. L. Morrow, the gases evolved were approximately 90 per cent hydrogen and 10 per cent carbon monoxide and carbon dioxide. The evolution of hydrogen upon irradiation of cellulose with 2537-A light does not seem to have been previously noted in the literature; it was found to follow a parabolic rate law, indicating inhibition by a product. A plausible explanation of the source of hydrogen is the photolysis of alcohol groups by the over-all reaction as shown in the following equation, where h is Planck's constant and ν is the frequency of the irradiating light:



This reaction is known to occur when liquid alcohols are irradiated at approximately 2000 A.

An equation was developed for calculating the number of chain fractures in the photochemical degradation of solids. Application of this equation to data derived from the experiments showed that a close parallel existed between amounts of carboxyl formed and the calcu-

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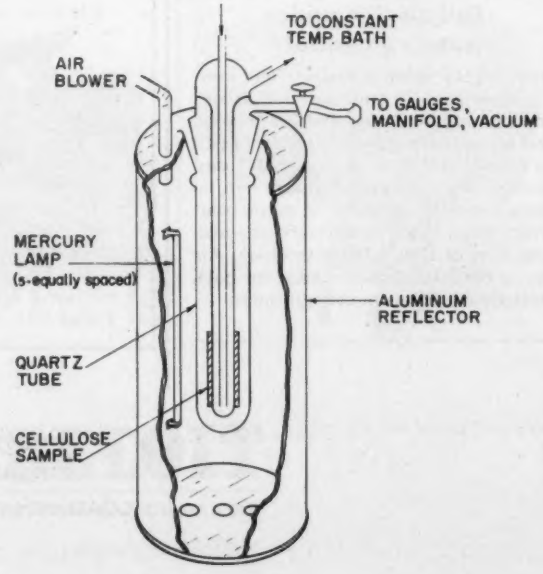
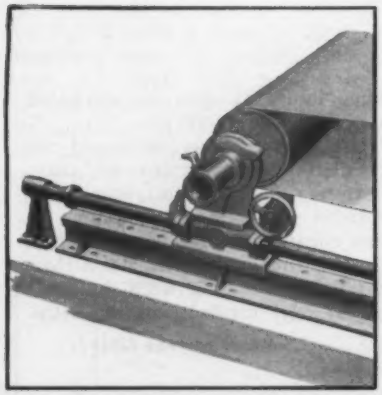


Partial cutaway view of the cylindrical aluminum reflector containing the reaction vessel and irradiation apparatus.

BELOIT UNIT MODERNIZATION

Is your Press Section a limiting

MODERNIZATION
WITH PROVED BELOIT UNITS
...CUTS OPERATING COSTS
...INCREASES OUTPUT
...IMPROVES QUALITY

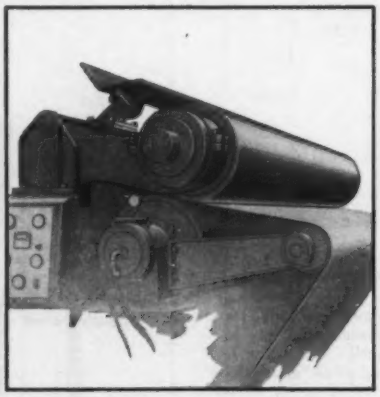


Felt stretch under positive control?

Heavy-duty Beloit felt-stretchers combined with felt tension indicators provide positive control of felt tension and stretch. Optimum felt stretch can be maintained from shift to shift, day to day. Felt life and drainage can be increased—felt guiding is more positive. Seam-straighteners are an integral part of Beloit felt-stretchers. Air motor operators are available for both stretchers and seam-straighteners.

Press crowns a problem?

If so, consider stiffened, rugged Beloit press rolls. Bolted heads coupled with Beloit heavy-wall design result in uniform deflection as opposed to press rolls with cast heads. Heavy-duty antifriction bearings are protected from loss of lubricant or entrance of moisture. Call on Beloit for grey iron, ductile iron, or granite press rolls for dependable service at press, size press, breaker, or wringer roll positions.



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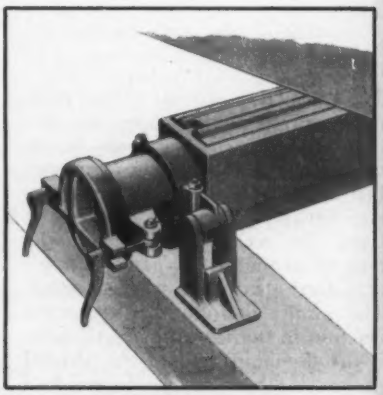


Felts filling up?

Many mills have found Beloit felt suction boxes a profitable answer to longer felt life and improved sheet quality. A Beloit felt suction box and shower arrangement provides full-width continuous cleaning—keeps felts clean and open. An adjustable slot width supplies just the right amount of vacuum for the specific application. A low-cost addition that can keep felts cleaner—longer.

PROVED BELOIT UNITS FOR THE PRESS SECTION: FELT ROLLS
PAPER ROLLS • SAVEALLS • PRESS DOCTORS • DIAPHRAGM
LOADING UNITS • SHOWER ARRANGEMENTS • MARKING EQUIPMENT

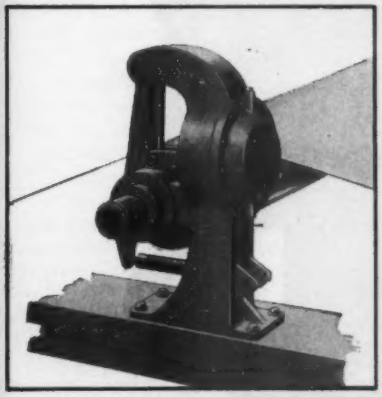
ONE OF A SERIES SHOWING TYPICAL BELOIT SOLUTIONS TO COMMON MILL PROBLEMS

factor in your production picture?

Modernize your press section with proved Beloit units. Components for the press section of your paper machine shown here have proved to be of special value in increasing output, improving quality, reducing machine downtime, and cutting operating costs. A Beloit press arrangement is available for every paper machine application. Let Beloit sales engineers show you the best press design for your machine. Their suggestions can pave the way to greater profits.

Felts running off periodically?

A felt lost due to guide failure can cost more than a new Beloit air diaphragm felt guide. Why not modernize with a low-cost Beloit automatic felt guide now? The patented Beloit air diaphragm guide moves the guide roll smoothly and efficiently. Its rate of response is independent of felt speed —its outside power supply reduces felt edge wear. The entire mechanism is simple, foolproof, rugged—no small parts subject to easy damage. Models available for every press application.



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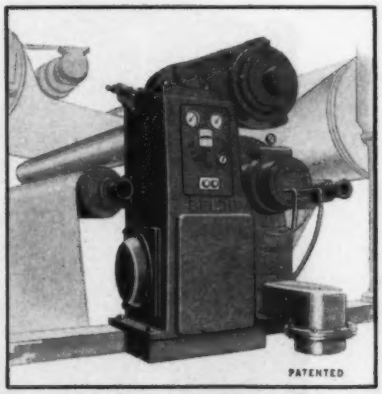

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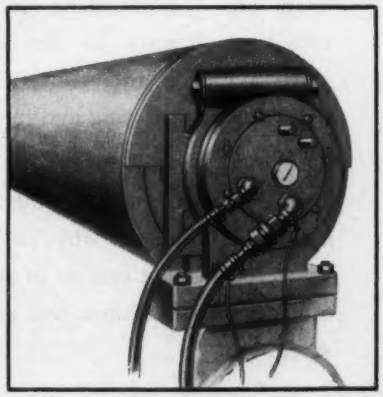
Heavyweight sheets a problem?

The Beloit hot press is doing a fine job on machines running heavyweight grades. The hot press dewaters the sheet after it has been raised in temperature, resulting in greater water removal and a dryer sheet to the main dryer section. The Beloit hot press arrangement may be employed as a plain hot press or a suction hot press depending upon your requirements. When used as a suction press, the hot press employs the unique Beloit air-bleed principle.

Speed limited by drying capacity?

Get maximum sheet dewatering at minimum cost with Beloit suction rolls. Machines can run better at increased speeds and with improved operating efficiency—and a dryer sheet entering the dryer section. There's a Beloit suction roll for every press section application: suction press, suction pick-up, suction pressure, suction transfer, suction felt, suction wringer, or suction hot press.



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ONE GOOD LOOK

at this new BIRD

CENTRISCREEN

and they started placing orders

Bird Centriscreens are totally enclosed, high capacity pressure screens so superior in design that they justify immediate consideration.

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They are demonstrating extraordinary efficiency of dirt and shive removal and substantial reduction in operating and maintenance cost.

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CURRENT COMMENTS

Out of the slough . . . the session ends . . . and no recourse

by WARREN B. BULLOCK

If the behavior of the newsprint industry is a correct barometer of paper's financial situation, it would appear that the over-all industry is climbing slowly but certainly out of the slough of despond into which it followed the rest of the nation's economy. Canadian studies of the newsprint industry are growingly optimistic after an admittedly difficult year. Canadian newsprint securities have been more popular of late with such buyers as institutional groups on the premise that these securities have reached their lowest levels, and that there is no place to go but up. A Canadian survey showed that Powell River paid out $1.50 in dividends for the year ended June 30, while its net profit was $1.52 per share. Great Lakes disbursed $1.60 per share, while its earnings were only $1.39. Most American companies, however, were able to meet dividend requirements, and there have been comparatively few cases in which payments to stockholders have been reduced.

Over-all reports from the United States industry indicate that net earnings for the first half of 1958 were off 20 per cent from those of 1957; but sales in the second quarter dropped only 2½ per cent from the 1957 record and showed an upward trend as compared with earlier months.

West Virginia Pulp & Paper reduced its dividend for the current quarter to 30 cents per share as compared with the 40 cents paid in previous quarters. President David L. Luke Jr. ascribed the action to the directors' wish to conserve resources in the face of growing capital requirements (because of expansions of company operations). On the other hand, American Writing Paper voted to increase its dividend for the current quarter to 50 cents, as compared with the 25 cents per share paid in many previous periods.

Four, not five

The current session of Congress has ended with action taken in three directions directly affecting the paper industry. The Reciprocal Trade Agreement Act was extended for four years instead of the five requested by the president. Announcements of negotiations for further duty rate reductions can be expected momentarily. The paper industry in the past has always been included as a primary target for such reductions, and there is no reason to expect that the next international negotiating session will be different in tone from those that have preceded it.

Congress has passed a bill to allow newsprint rolls measuring as low as 13 in. to enter the country duty free, as against a former minimum of 15 in. This was at the behest of the newspapers, only a few of which actually use such narrow width rolls and then exclusively for special sections. The bill was passed by the Senate without an opportunity for domestic industry to be heard.

The twilight zone

Congress also passed a bill amending the Anti-Dumping Act, which is considered in some quarters to give added protection to domestic industry against under-priced merchandise. Under this act the Tariff Commission is empowered to determine whether an industry is injured by the sale of low-priced merchandise. If no injury is proved, the domestic industry has no recourse under the act regardless of the prices at which the foreign commodity is sold either domestically or in the country of origin. The first investigation under this provision involves lightweight wrapping tissues. Hitherto, imposition of dumping duties has frequently been denied because administration officials ruled that domestic industries were not being injured. What constitutes injury sufficient to justify imposition of special duties is as yet in the twilight zone of economic determination.

Financial Reports

Increasing optimism over the general business situation carried the securities markets to their highest 1958 figures, and paper mill issues joined in the movement—including those of newsprint makers.

Stock and Bond Quotations

New York Stock Exchange Stocks

Closing Prices	Sept. 10, 1958	Aug. 1, 1958
American Can	47½	49⅞
Same Pref.	37¼	—
Celotex	34½	32⅛
Same Pref.	* 18-18⅛	* 18-18½
Certain-Teed	11⅝	10½
Champion P. & F.	41	41⅜
Same Pref.	94¾	97¼
Chesapeake	31	30¾
Container	24	24
Same Pref.	86	* 94-98
Continental Can	49¼	49⅜
Same Pref.	86	88
Crown Zellerbach	55¾	51¼
Same Pref.	* 94-95¼	98¾
Diamond Gardner	33⅝	32
Same Pref.	* 30¼-31¼	31½
Eastern	43¼	37¾
Federal Paper Board	44¾	42⅝
Same Pref.	20¾	21¾
Fibre Paper Board	36¼	32¾
Same Pref.	121	109
Great Northern	59	48¾
Hammermill	31¾	30½
International	107¾	103⅜
Same Pref.	* 90-91	* 92½-93½
Kimberly-Clark	67⅞	57½
MacAndrews & Forbes	29⅝	27¼
Masonite	37⅛	34
Mead	42⅜	41½
Same Pref.	* 94½-95½	* 94-95½
Minnesota & Ontario	30½	29
Oxford	32½	33½
Same Pref.	93	* 94½-96½
Rayonier	19¼	20⅛
Riegel	30½	30
St. Regis	39	36⅝
Same Pref.	* 94⅞-96	* 96-98
Scott	68¾	67
Same $4 Pref.	—	* 97-98
Same $3.40 Pref.	* 79-83	* 83-85
Sealright	33¾	35
Sutherland	41¾	38⅛
Union Bag-Camp	37¼	37⅛
United B. & C.	30½	25
United Wallpaper	* 7⅛-7¼	6⅛
Same Pref.	* 15-15½	* 13¼-15
U. S. Gypsum	87	86¾
Same Pref.	*161¼-165	168
West Virginia P. & P.	40¼	40
Same Pref.	*100-102	*100-102

New York Stock Exchange Bonds

Champion P. & F. 3¾%	—	91⅝
Champion P. & F. 3%	—	—
Kimberly-Clark 3¾%	94	100¼
Mead 3%	—	—
Scott 3%	100½	103

American Stock Exchange Stocks

Allied Paper	10¼	9
American Writing	25¼	24
Brown	11⅝	11½
Puget Sound P & T	18⅞	17¼

*Closing Bid and Asked Prices

Bob Riley, Superintendent (center), and Leo Newtown, Assistant Superintendent (right), of Crown Zellerbach's West Linn, Oregon mill, discussing felt operation with Huyck's Roy Keller. The machine, a two-press Fourdrinier, is running newsprint at 1,630 f.p.m.

Another crowning achievement for Huyck at Crown Zellerbach

At the left, you see two felt service life records marking another crowning achievement for new Huyck felts at Crown Zellerbach Corporation's West Linn, Oregon mill.

These record runs were made by papermaker and feltmaker working *together* to achieve maximum operating efficiency from wet-to-dry end of the machine.

Out for a record run this year? Your *Man-from-Huyck* will be glad to work with you in analyzing your felt requirements.

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Easy-to-set electronic signals - .002" spacing accuracy

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Eliminate hand gauging. The Lawson Electronic Spacer automatically positions each cut to within .002". Easy-to-set signals slide quickly into place. No physical contacts . . . electronic accuracy is not affected by dirt, dust, rust or humidity. Six sided spacer bar permits almost unlimited cutting combinations . . . green light signals operator to make cut. Set repeat jobs on plastic strips, file away until needed.

Increase production. The Lawson Electroni Spacer paces your operator to new productio highs. Truly cushioned hydraulic clamping an fast, straightline knife action combine to give ripple-free cut edge on lifts t 6½" high. Unmatched for ac curacy, production and eas operation, the Lawson Elec tronic Spacer Cutter is sized t suit your needs—39" through 69". Write for full details today.

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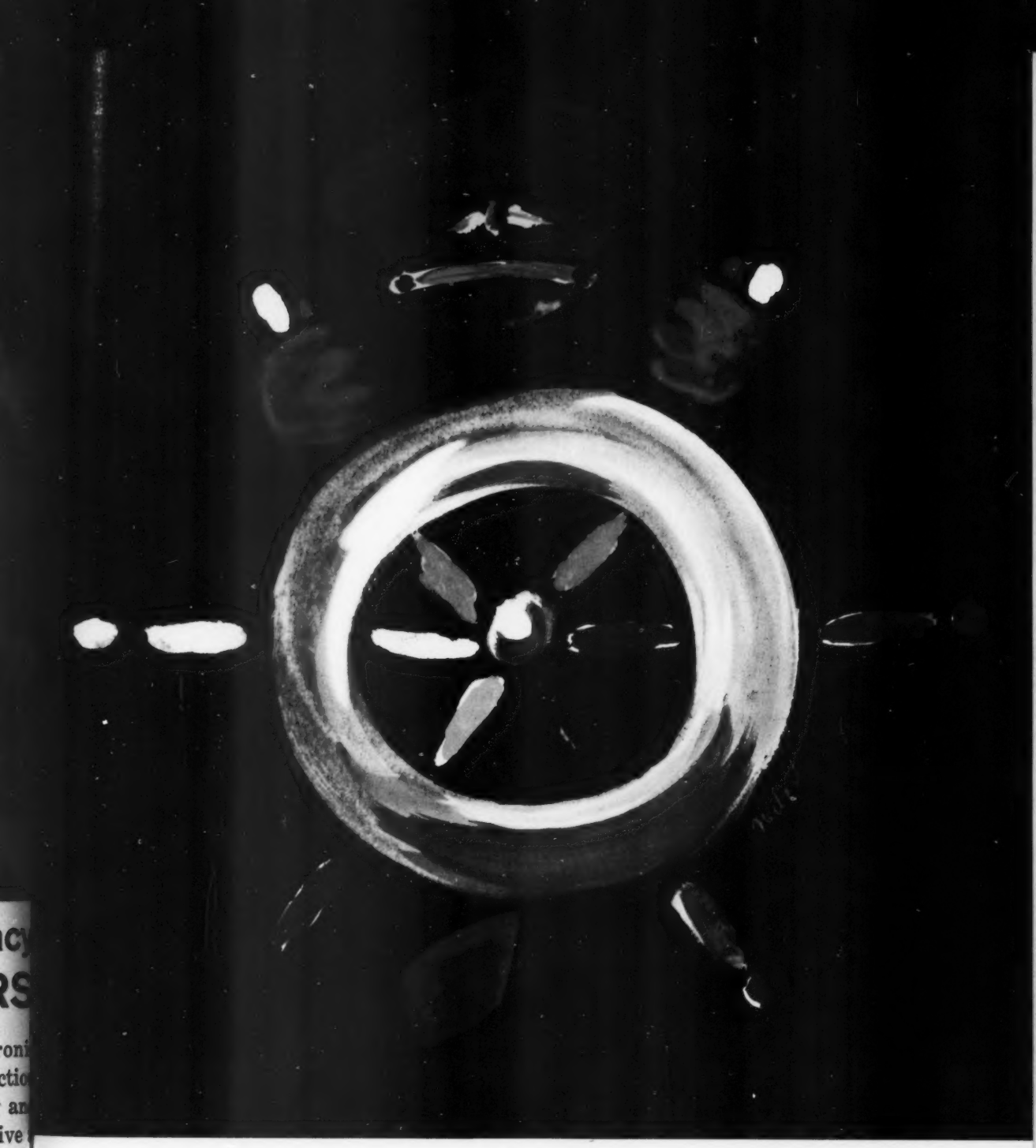

NEW HANDS AT THE HELM at Pusey and Jones!

Now in command at the nation's oldest paper machine manufacturer is brand new management. The course these men have charted avoids delays in the delivery of machines; promises, in fact, more on-time start-ups and satisfactory performance than ever before from all Pusey and Jones equipment.

Your representative will be happy to tell you more about the *new* Pusey and Jones, and how your operations can benefit from it. See him or write direct.

Shipbuilding • Heavy Metal Fabrications

Paper Machinery Division

THE PUSEY AND JONES CORPORATION

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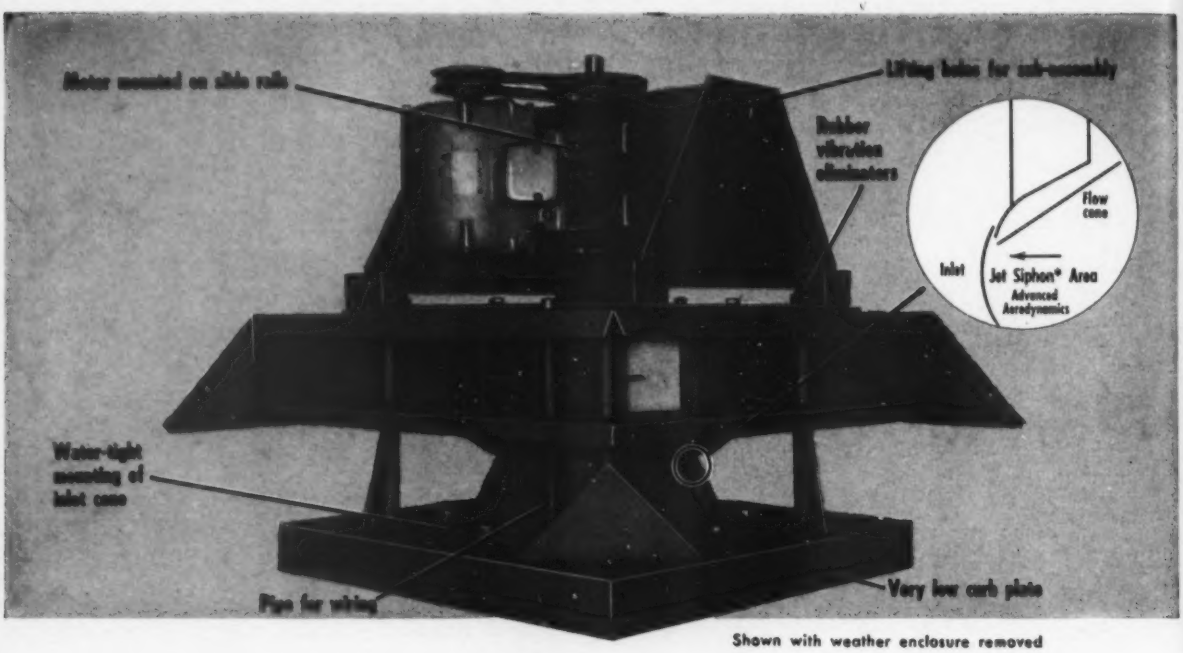

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Jet Siphon* feature for stable, high efficiency.

Static pressures to 2" — thus well suited to both light-duty installations without ductwork and applications where ductwork or hoods impose considerable resistance.

Adaptable to a wide range of motor sizes.

Variable pitch V-belt drive.

Wheel and inlet designed for streamlined air flow.

Built heavy-duty throughout to assure long-lasting, trouble-free service.

Every wheel statically and dynamically balanced on precision machines.

Inspection panel and complete accessibility.

Low overall height.

Venting of motor and drive area.

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Heavy-duty anti-friction bearings.

Simple installation — only 4 bolts required.

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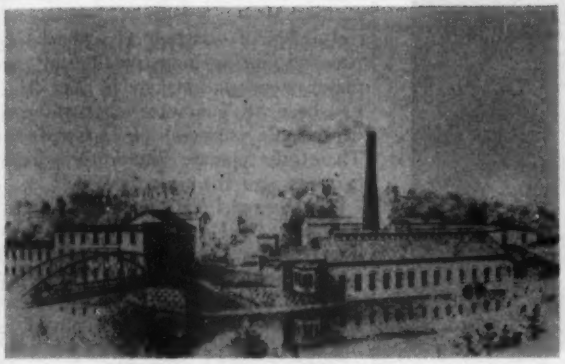
NEWS of the INDUSTRY



1858—The Adams Bag Co. mill on the Chagrin.

1958—Chase Bag Co.: the same historic site.

From Flour Bags to Specialties: Chase Bag Mill Enters 101st Year

IN 1858 A SMALL mill on the banks of Ohio's Chagrin River produced its first manila rope stock paper. The ultimate use: flour bags.

Today the paper mill of Chase Bag Co. turns out a wide variety of specialty papers. By choice, it limits the quantity and specializes in hard-to-make high-specification kraft for exacting requirements.

The Chagrin Falls, Ohio plant is looking to the future in its centennial. Scheduled is a modernization of the pulp preparation and finishing equipment. Included is the installation of a Morden Machines Co. Slush-Maker and a 72-in. Cameron Machine Co. rewinder. A Black-Clawson Co. guillotine roll splitter is also set for installation.

Storage and shipping facilities will be enlarged and improved.

Fourdrinier Modifications

Extensive plans are in process to modify existing fourdrinier equipment so that it will be "one of the most versatile and flexible specialty paper machines in the world".

The old mill and two dams on the Chagrin River are well known landmarks of the Cleveland area. The original stone mill still stands surrounded by the modern buildings that house Chase's fourdrinier and cylinder equipment.

It was in 1841 that the Chagrin Falls site was first used—for a water wheel to power a nearby flour mill. In 1842 an axe factory was established at the location of a second dam. And a few years later the stone flour mill was purchased by Lake Erie Paper Co. and rebuilt into a newsprint plant.

In 1858 Adams & Co. of Cleveland acquired the property for the production of manila rope paper to be used in the manufacture of flour sacks. The firm is credited with introducing the first paper bags for flour. Daily mill capacity in 1858 was 4 tons.

Civil War Expansion

Because of the scarcity of cotton, the mill on the Chagrin expanded rapidly during the Civil War. And shortly after the turn of the century the Adams firm consolidated operations at Chagrin Falls with the construction of a bag printing operation.

In 1906 the capacity was increased to 11 tons per day. New bag machines and additional printing presses were required; the firm, now known as Adams Bag Co., continued to expand operations.

Chase Bag Co. of New York, N. Y., purchased the mill in 1926 as a source of paper for its nationwide market in the packaging field.

A fourdrinier machine for the manufacture of spinning and multiwall papers was installed in 1948. And shortly thereafter the plant began entrance into the kraft specialty field, pioneering grades of paper for outside sales.

P&J Machine Shipped to Southland Paper Mills

Southland Paper Mills Inc. of Lufkin, Texas, will install a 270-in. fourdrinier machine. The unit was shipped during August from the Pusey & Jones Corp. plant in Wilmington, Del.

The $3,000,000 machine has a delivery speed of 2500 fpm and is completely equipped with roller bearings. The wire is 118 ft. in length and the breast roll 34 in. diameter. The diameter of the table rolls is 17 in.

The unit is equipped with 10 suction boxes, a suction couch roll 44 in. in diameter and a couch drive roll 38 in. in diameter. Over-all length of the machine is 400 ft.

Featured are an air pressure type headbox and slice with a cross-flow stock distributor. A new design Rapi-drape system permits quick wire changes as well as pre-draping of the wire. This system utilizes hydraulic units to raise and lower the breast roll and operate the wire changer assembly.

Sixty-four Dryers

The press part has five suction rolls—a 32-in. bronze pickup, a 44-in. transfer, two 44-in. main presses

OPERATING AT an initial 1750 fpm is the "world's largest paper machine" now in the production of newsprint at the Fort William, Ont. mill of Great Lakes Paper Co. Ltd. The production rate of the Black-Clawson Co. unit will be increased to speeds of more than 2000 fpm. New No. 4 boasts a 342-in. cantilever fourdrinier plus stock inlet, vacuum pick-up, transfer press, main press section, dryer section, calender, reel, unwind stands and winder. It is designed to turn out 32# newsprint and to produce up to 425 tons per day. The machine increases the mill's total annual capacity to 360,000 tons, well over twice the 156,000 tons of 1956, and completes the expansion program undertaken by the firm in 1955.

and a 34-in. wringer, all rubber-covered.

The dryer section consists of fifty-five 60-in. diameter paper dryers, one 60-in. sweat dryer and eight 60-in. felt dryers. These are divided into two main sections with four felts.

The main bearings and enclosed gearing are lubricated by a Bowser Inc. system. Threading the sheet is accomplished by means of a rope carrier device. The dryer section is completely enclosed within a J. O. Ross Engineering Corp. hood.

The calender stack contains eight rolls, with a 40-in. diameter bottom roll. The stack is equipped with an electric lifting mechanism, Bowser lubricating system and Vickery type (Bird Machine Co.) doctors.

A Pusey & Jones horizontal track reel has been incorporated in the installation.

Speeds of up to 6000 fpm can be obtained on the Cameron Machine Co. winder that is equipped with score cut slitters and a Cameron hydraulically-operated rider roll lift.

Noralyn Paper Studies Southern Possibilities

With the construction of Baton Rouge, La.'s newest major industry, more United States-produced newsprint will become available. Noralyn Paper Mills Inc. will construct at the southern city a plant for the manufacture of paper from Louisiana woods.

Early in September the newly formed company shipped to a major research institute several truckloads of swamp hardwood. Here it was to be converted into pulp and paper in a four-week investigation that would supply construction engineers with the necessary data on capacities and specific types of equipment that would be required in the proposed mill.

According to the firm, "when the investigation is completed Noralyn will have advanced yet another step toward transforming Louisiana hardwoods into newsprint, thus opening an innovation in southern papermaking".

Nine Pounds of Steam . . .

In a recent survey completed by Allied Paper Corp. at its Kalamazoo, Mich. mills it was found that:

(1) 9/10 lb. of coal is required to produce 1 lb. of paper;

(2) Some 30,000 gal. of water are required to convert wastepaper into 1 ton of pulp, and

(3) The production of 1 lb. of paper requires 9 lb. of steam.

Improved Quality and Uniformity the Aim of Allied in New Program

Radical departures from former procedures have been established by Allied Paper Corp. in an extensive program aimed at the improvement and maintenance of quality and uniformity.

The company, with mills at Kalamazoo, Mich., is one of the largest consumers of wastepaper in the book paper-producing industry. One of the major steps undertaken by the firm has been to guarantee constant and dependable sources of wastepaper. Therefore, separate specifications have been devised for each type used.

These specifications have been clarified, developed and put into operation with the cooperation of wastepaper suppliers. Allied's graders now rigidly enforce these specifications. "As a result", according to Harley E. Nelson, "we now receive wastepaper packs that are quite uniform in fiber content and free of offending materials." Nelson is Allied's technical director.

Another major step has been the establishment of technical control over deinking plants. This entailed the development of positive control over the various chemical processes that are required in deinking operations. The goal of course is cleaner pulp with more uniform brightness and color. Also involved is the use of chemical coagulants.

In the paper mills themselves all beaters, measuring tanks and chests have been recalibrated and restandardized within the last six months. New glues are "giving Allied papers better printing surfaces and more opacity". And with respect to moisture content, the firm has installed

BEING READIED FOR shipment to the new mill of Boise Cascade Corp. in Walla Walla, Wash., are seven of the 43 paper and felt dryers that will be installed on the new Black-Clawson Co. 164-in. fourdrinier. The rolls are shown being tested at the Paper Machine Div. of B-C for 250-lb. hydrostatic pressure, which will certify them for interlocking pressure of 125 psi saturated steam. Officials of Boise Cascade expect that the new mill will be in production of kraft bag and wrapping papers and kraft linerboard early in 1959.

additional moisture detectors and recorders.

The future calls for the establishment of automatic controls on chlorination and hypochlorite bleaching stages in the deinking mills. According to Nelson, "the exact metering of such chemicals as rosin size, alum and starch to each of the paper machines together with automatic pH controllers for each wet end will enable us to produce printing papers having very uniform and dependable press performances".

And "so as to hold variations on such things as weights, caliper and bulks to narrow limits, each paper machine will be equipped with the latest in basis weight controllers".

New Brunswick Forests Facing Depletion

The easily-accessible forests of New Brunswick may be in serious danger of depletion. This according to the recently published forest inventory made by the provincial department of lands and mines.

The report states: "Without venturing into the field of policy recommendation, one is tempted to conclude that the more accessible and settled areas are being exploited at a nearly dangerous rate."

It also states that, "much of the less accessible and more mature forest is being exploited at a nearly satisfactory rate". And, "the greatest opportunity for expansion lies in some fairly accessible and fairly mature forest and in a considerable area of relatively inaccessible forest rapidly approaching merchantability."

Continental Can Opens Research Laboratory

Researches into the manufacture and uses of corrugated containers will be carried out in a new laboratory recently put into operation by the Fibre Drum & Corrugated Box Div. of Continental Can Co. Located at Van Wert, Ohio, the facility is fitted out with the latest testing equipment.

Supplementing the division's existing fibre drum research operation, the new laboratory has been constructed as a building within a building, thus eliminating the influence of outside atmospheric conditions that would hamper maintenance of the desired test atmosphere of 50 per cent relative humidity and 73°F.

Directing the operations of the new facility is C. H. Root, who recently became manager of corrugated research following 23 years

Look what happened to the corn we took off the cob

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SCAPA Synthetic-Reinforced* ASBESTOS DRYER FELTS

Types 8175-S—8480-S (background photo)—8985-S

Wherever ASBESTOS Dryer Felts are indicated, SCAPA Synthetic-Reinforced Asbestos Felts will outperform any felt in its class. (Approx. 10% Synthetic)

With a background of years of successful operation, these fine Felts now have the added feature of SCAPA Synthetic-Reinforcement in every thread.

TECHNICAL PROGRESS is the keynote in the manufacture of these Dryer Felts: the mechanical design of the weave itself, the preparation of the yarn, the actual weaving of the Felt, and the final Pre-Stretching and Finishing operations. Every feature of these Dryer Felts is designed to give top performance in keeping with the latest advanced concepts of high-speed papermaking.

*U. S. Patent Application Serial No. 524,410

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Sole U. S. Agents for

SCAPA DRYERS, INC.
WAYCROSS, GEORGIA

News of the Industry . . .

on the staff of the Institute of Paper Chemistry in Appleton, Wis.

A pre-conditioning room in the new laboratory sustains control conditions of less than 35 per cent humidity; while in a high-temperature humidity room a controlled relative humidity of up to 95 per cent and temperatures of up to 150°F may be achieved. Low-temperature testing has been provided in a walk-in refrigerator that can hold temperatures down to as low as minus 30°F.

Other modern equipment includes a 90-in. motor-driven sample maker; a Conbur tester; a 36- × 48-in. compression tester; a 7-ft. revolving drum tester; a 1000# vibration tester; a drop tester, and miscellaneous testing instruments such as Mullen, Beach, tear, Concora and impact.

"The Operation was a Success"

No. 12 Machine Renovated at Champion's Carolina Div.

CRANE UNLOADS new dryers from flat cars at the Carolina Div. mill of Champion Paper & Fibre.

TORN APART, the wet end of No. 12 machine looked like this on the morning the renovation began.

CHAMPION RIGGERS install the new 13-ton dryers during the shutdown period that lasted 8½ days.

COMPLETED FOURDRINIER ready to be motored into position is shown in the aisle between Nos. 11 and 12.

IN 1932 CHAMPION Paper & Fibre Co. installed at Canton, N. C., what was then the largest white paper machine in the world. There were many who believed that the unit was much too big to turn out white paper economically.

But, over the years No. 12 has been a profit-maker—this chiefly because the firm has found ways to get orders for long runs. More than 1,000,000 tons have rolled off the dry end. In the future the Pusey & Jones

(Turn to Page 466)

WITH THE FOURDRINIER in position, the new wire receives final adjustments just before start-up.

Suppliers to Champion Renovation

Steam piping insulation	Starr Davis Co.
Valves	William Powell Co.
Felt-carrying roll and bearing arrangement	Pusey & Jones Corp.
Instruments	Foxboro Co.
Diaphragm motor valves	Fisher Governor Co.
Cast iron dryers with Johnson steam joints	Pusey & Jones Corp.
Table rolls, wire roll and side frames for wire extension	Pusey & Jones Corp.

Corp. machine is destined to produce more and to produce it faster.

An 8½-day Task

After almost continuous operation for more than 25 years, No. 12 was shut down for its first major renovation. Working around the clock for 8½ days, Champion craftsmen, operators, engineers, technicians and supervisors successfully completed the operation.

J. E. Hall, general superintendent of paper and board manufacturing, declared that he had never seen anything like it in his papermaking career.

A major portion of the mechanical improvement included the installation of 16 new 13-ton dryers with 125-lb. pressure. The replaced units boasted only 35-lb. pressure.

Fourdrinier Lengthened

In increasing the length of the fourdrinier the length of the wire was boosted from 85 to 110 ft. The machine today is capable of a speed of more than 1000 fpm.

Prior to the recent changes No. 12 had a daily production capacity of about 180 tons. Today that figure stands at 225 tons.

Recent Expansions in the Industry

Champion Paper & Fibre Co. has acquired from Crown Machine & Tool Co. of Fort Worth, Texas, the sole licensing rights for making and selling Thermokup cups and containers in all but three states (Texas, Louisiana and Oklahoma). Thus Champion is entering the disposable plastic container field with a product that "can be held in the hand while containing boiling liquid". Current plans are for the cup to be manufactured by Mid-West-Pak Corp. of Belvidere, Ill., a subsidiary of Champion.

Union Bag-Camp Paper Corp. has broken ground at Glens Falls, N. Y., for a 50,000-sq. ft. plant to be occupied by its Honeycomb Div. The 10-acre site is part of an 85-acre tract owned by Finch, Pruyn & Co. Inc.

Bathurst Power & Paper Co. Ltd. is adding a second specialty cylinder machine at Bathurst, N.B., for the production of high-quality boxboards. The new unit, which is expected to be in operation early next year, will boost the plant's capacity by 25,000 tons annually.

Sorg Paper Co. of Middletown, Ohio, will rebuild its No. 4 paper machine at a cost of $650,000. The project will involve the relocation of all equipment except the rewinder and will increase the length of the unit by about 20 ft.

Allied Notes . . .

Appleton Machine Co. of Appleton, Wis., is observing its 75th anniversary with a year-long program of special events and promotional activities. The theme of the diamond jubilee, which will continue through June 1959, is "75 Years of Progress Through Specialization".

Bauer Bros. Co. of Springfield, Ohio, has opened a new district sales office at Jacksonville, Fla.

Harry C. Moore, president of **Beloit Iron Works,** and S. Harley Jones, president of **E. D. Jones & Sons Co.,** have jointly announced that an agreement has been reached whereby Beloit will acquire the assets of the Pittsfield, Mass. firm. E. D. Jones will continue the manufacture of its same product lines and under present management.

Borg-Warner Corp.'s Atkins Saw Div. has announced that Lynn & Brooks of San Francisco is serving as its hardware representative in Washington, Oregon, California, Idaho, Utah, Nevada, New Mexico, Arizona, Colorado, Wyoming and Montana.

Lunkenheimer Co. has moved its Boston sales office and warehouse to 313 Mystic Ave., Medford, Mass.

D. J. Murray Mfg. Co. is currently celebrating its 75th anniversary. The Wausau, Wis. firm is one of the best known manufacturers of pulp mill machinery for both the United States and foreign markets.

Coming Events

Tappi

October 20-22—13th Plastics-Paper Conference, Sheraton-Kimball Hotel, Springfield, Mass.

November 5-6—Eighth Corrugated Containers Conference, Netherlands-Hilton Hotel, Cincinnati

Superintendents Association

October 15-17—Southern and Southeastern divisions (joint meeting), Read House, Chattanooga, Tenn.

December 4-6—Pacific Coast Division, Sir Francis Drake Hotel, San Francisco

Other meetings

October 13-15—Packaging Institute Inc., 20th Annual Forum, Edgewater Beach Hotel, Chicago

October 20-21—Instrument Society of America, National Rubber & Plastics Instrumentation Symposium, Akron, Ohio

October 20-24—46th National Safety Congress and Exposition, Chicago (Pulp & Paper Section meetings at the Conrad Hilton)

December 1-5—23rd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y.

WHEN YOU DE-INK WITH . . .

d-i LESTOIL LIQUID DETERGENT

D-I LESTOIL

1. Dissolves and disperses ink, wax, oils, asphalt, fillers and other contaminants.
2. Promotes rapid and complete defibering — makes fibres free-flowing.
3. Keeps entire system clean — helps prevent slime deposits.
4. Prevents soil deposits and build-ups on wires, Yankee Dryers, etc.
5. Is ideal for washing felts — on or off the machine.

Want to get good, clean, low-cost furnish from mixed wastepapers or other low-grade materials? — Or from rope, rags, cotton linters or cotton mill sweeps? Want a cleaner, clearer sheet with a look of quality that spells profit?

d-i LESTOIL can help you do it — without expensive formulas, without changes in your present equipment and at a saving in time, labor and power.

d-i LESTOIL combines thorough wetting, penetrating, emulsifying and dispersing actions. Added to stock in the boiler or pulper, it quickly and thoroughly removes ink, grease, wax, asphalt, adhesives and other contaminants, and prevents their redeposit in the stock.

What's more, d-i LESTOIL promotes rapid and complete defibering of paper stock, and helps keep your felts, wires and your entire system whistle-clean.

Why not find out — at our expense — what d-i LESTOIL can do for you? For a generous free sample and descriptive literature, write today to

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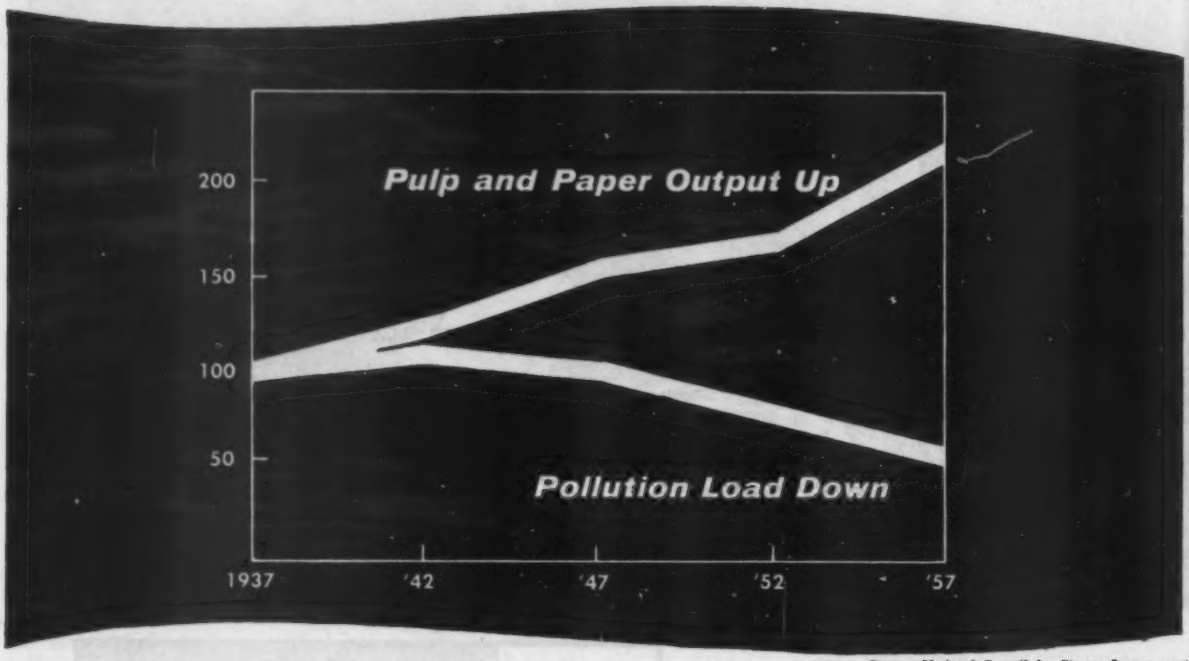

Source: National Council for Stream Improvement (of the Pulp, Paper, and Paperboard Industry).

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Self interest and the public interest are one and the same when it comes to treating "white water." Chemical treatment with appropriate coagulation chemicals pays off in important savings through recovery and re-use of filler and fiber . . . stream pollution is minimized by delivering a clearer effluent.

For the chemicals you need in your "white water" treatment operations, call on General! General Chemical has served the paper industry for over 50 years . . . is a leading producer of Alum and many other water-treatment chemicals. Producing works and stock points from coast to coast are geared to meet your needs efficiently and quickly. That's why General Chemical is your *best* source of supply. Experienced technical service is always readily available. For further information, just write or phone our nearest office.

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NAMES *in the* NEWS

MISS ARNOLD receives the award. From left: G. S. Brickett, plant engineer for Congoleum-Nairn; J. R. Mann, plant superintendent; A. E. Sprinkle, plant manager; Miss Arnold; H. S. Van Ryper, Bolton sales representative, and H. M. Reiniger, Bolton vice president for sales.

Portrait of a Bolton Winner

Faith in Free Enterprise Wins Bolton Award for C-N Secretary

ELLEN ARNOLD is secretary to the plant engineer at Congoleum-Nairn Inc. of Cedarhurst, Md. She is interested in industrial and public relations—good relations. This interest won for her second prize in the recent 11th Annual Bolton Award Essay Contest sponsored by John W. Bolton & Sons Inc. of Lawrence, Mass.

Miss Arnold is concerned with the welfare of Congoleum-Nairn, its employees and its customers. "I have within myself", she said in her essay, "the power to help to improve relations between my company and my community; and, more than that, I can help indirectly to improve the relations between *your* company and *your* community."

This "average worker", as Miss Arnold identified herself in the essay, has a thirst for knowledge. She is enrolled at the evening school of Western Maryland College in Westminster, specializing in history, politics and art. Her familiarity with the history of this nation came into play in her award-winning work. "There are many forceful groups at work in our nation today", she said, "who for reasons known only to themselves believe that the 'proletariat' is being exploited, that all of us who work in mills and factories are the 'masses', that our employers are our enemies, and that we are looking forward to the day when we shall rise against this 'tyranny' and rule ourselves. We can counteract this vicious line of thought by spreading the word that all of this just isn't so."

Sports and History Mix

Business and school consume by no means all of Miss Arnold's time. She manages to belong to a bowling league, and in the summer she swims, hikes and plays badminton. "I would rather perform than watch", she says. But, above all, knowledge is her goal. Thus she continues her essay, ". . . through public forum, through civic groups, through casual conversation and through day-to-day contacts I can uphold the (free enterprise) system that has made my life so comfortable. To do this, of course, I shall have to keep myself informed. We workers must be informed and aroused to the task; we cannot afford to be ignorant and apathetic".

Miss Arnold is active in community politics and has served as publicity chairman for her party. This ties in with her theory that good relations—both public and industrial—are indispensible to the welfare of American business. She had this to say in the Bolton essay: "Another thing that I as an average worker can do is to let the community know what my company does for me. If I do this, it will help my company to have a good reputation in the community, and the community thereby will realize that my company is a good place for its citizens to work. . . . through this same medium we can let our fellow citizens know what the company is doing for the community. We can remind them that our company is helping the economics of the town and its environs because of the weekly payroll. . . . I can let my friends know of my company's contributions to humanitarian causes, of its lending a helping hand."

Hospital and Jury

Miss Arnold is not satisfied with the minimum of outside interests. She manages somehow to squeeze in hard work for the local hospital campaign, jury service and church work. And still she serves Congoleum-Nairn well and faithfully and endeavors at all times to speak well of her employer's strong points and at the same time to bring attention to the weak.

"I can", she concludes in her essay, "(1) help to strengthen the basic philosophy of the free enterprise system; (2) let the people of my community know what the company is doing for me; (3) let the local citizens know of the importance of my company to the community; (4) help my company be aware of community criticism; (5) suggest to local management that plant tours be arranged; (6) be a good citizen of the community myself, and (7) practice simple rules of etiquette and use common sense in the community—particularly when going to and from the plant."

Institute Elects Two

R. C. Doane, president of International Paper Co., and P. F. Watzek, president of both Crossett Co. and Crossett Paper Mills, have been

elected to the board of trustees of the Institute of Paper Chemistry, Appleton, Wis. Both will serve for terms expiring in 1963.

The new members replace George E. Dyke, vice chairman of the board of Continental Can Co., and Thomas B. McCabe, president of Scott Paper Co. Their terms expired at the September 9 meeting of the board, and neither were eligible for reelection.

Beadle Retires at Consolidated WP&P

Warren E. Beadle has retired as Biron Div. manager of Consolidated Water Power & Paper Co. in Wisconsin Rapids, Wis. He has been with the firm 44 years.

W. E. Beadle

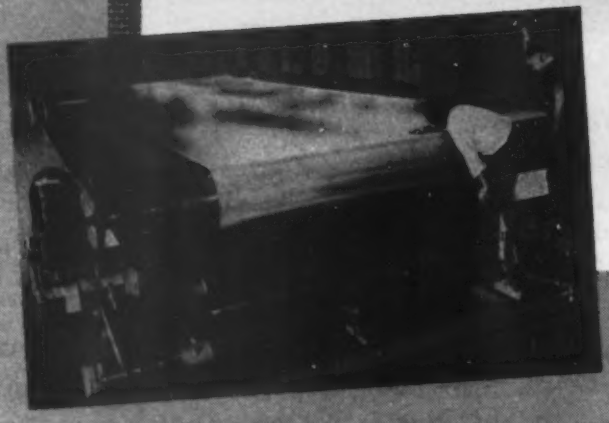
R. J. Mader

Division manager since 1936, Beadle joined the company in 1914 and was named Biron Div. master mechanic a few years later. In 1936 he became assistant division manager and later that year was named to the post he held at the time of his retirement.

Succeeding Beadle as division manager is Robert J. Mader, formerly production manager. He began his career with Consolidated in 1933 and prior to joining the Biron Div. staff spent seven years in sales service work.

Taking over Mader's post as production manager is Kenneth A. Kruger, who came with the company in 1926 at the Wisconsin Rapids Div. He was transferred to Biron in 1934 and has been serving as assistant to the production manager.

Two of the Men Behind Eastwood Wires



FINAL EXAM

Here James Baney and Clarence Reed are making a final, inch-by-inch examination of a large fourdrinier wire. Though this is a final check, it is only one of many given it at every stage of its manufacture, from the casting of the alloys in our own foundry to the stretching table inspection shown above.

Because the Eastwood-Nealley plant is a *completely integrated* operation, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours* — "from ingots to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

Raymond S. Hatch Retires

Raymond S. Hatch has announced his retirement (effective July 1, 1959) as vice president and director of research for Hudson Pulp & Paper Corp. This is the second time in his long career in the paper industry that Dr. Hatch has retired.

At Hudson since 1950, Dr. Hatch, now 75, joined the company as head of the chemical laboratory following his retirement from Weyerhaeuser Timber Co., where he had served as director of research in the Pulp Div.

Also announced by the firm was the appointment of Dr. Alex Sacher to the newly created post of vice president of commercial development. He was formerly technical director for Standard Insulation Co. Prior to his association with Standard Insulation, Dr. Sacher was on the staff of the Mellon Institute in Pittsburgh and that of Minnesota Mining & Mfg. Co., where he was assistant research director at the Irvington, N. J. division.

Raymond S. Hatch

J. L. Long

Long Retires at Crystal

J. L. Long has retired as executive vice president for Crystal Tissue Co. in Middletown, Ohio. He will continue as a director of both Crystal and its subsidiary, Crystal Waxing

Co., which is also located at Middletown.

Long began his career with Crystal in 1920 as storekeeper and inventory clerk. In 1925 he was made purchasing agent and in 1939 became executive vice president, general manager and director of the parent firm and president and director of Crystal Waxing.

In 1951 he resigned the presidency of the latter firm and the duties of general manager of Crystal Tissue in 1957.

William Race, president of Sutherland Paper Co. of Kalamazoo, Mich., was to fly to Berlin in September "to answer questions concerning the position and responsibilities of management in the American economy". He made the trip at the request of the United States Department of Labor and was to serve as co-host of an American exhibit at the Berlin Industrial Fair.

William Race

P. J. Hassett

Patrick J. Hassett, technical assistant to the kraft mill superintendent since August 1957, has been made assistant kraft mill superintendent for Nekoosa-Edwards Paper Co. at Nekoosa, Wis. He has been with the firm since 1953.

Bert H. Cooper, vice president of Kalamazoo Paper Co., has been elected the first president of the Paper Technology Foundation Inc. at Western Michigan University in Kalamazoo.

J. Larcom Ober of Beverly, Mass., a retired vice president of Scott Paper Co., has been reelected president of the University of Maine Pulp & Paper Foundation.

Dr. W. R. Haselton, vice president of operations, has been placed in charge of all operations of Rhinelander Paper Co., Rhinelander, Wis. —with the exception of sales and financial matters. C. C. Johnson, sales manager, has been named to assume the sales duties of Wilmer Davis, who has been appointed general manager of St. Regis Paper Co.'s Kraft & Converting Products

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test

Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

440 WILSON ROAD, SO. NORWALK, CONN.

Teamed to make Paper Progress Possible

EAST TEXAS PULP AND PAPER CO. Evadale, Texas
One MURCO 104" 10-knife Chipper

RAYONIER, INC. Jesup, Georgia
Two MURCO 110" 10 knife Chippers;
Two MURCO Rechippers; One MURCO Wood splitter;
One MURCO Stock Sampler

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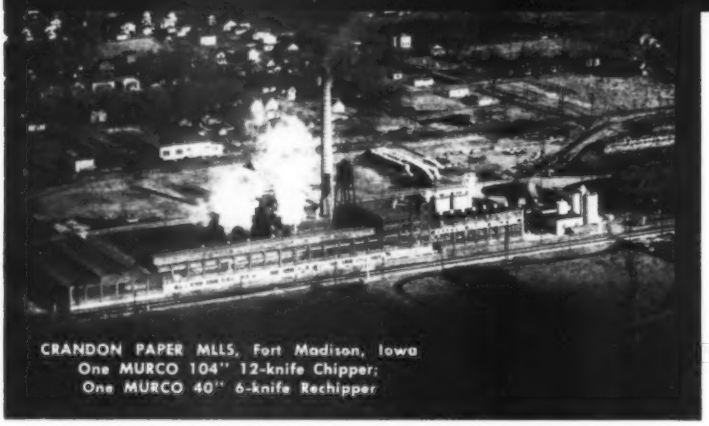
Heavy Duty Equipment!

ST. REGIS PAPER COMPANY, Jacksonville, Florida
Two MURCO 90" 10-knife Chippers;
Two MURCO 104" 10-knife Chippers



CRANDON PAPER MLLS, Fort Madison, Iowa
One MURCO 104" 12-knife Chipper;
One MURCO 40" 6-knife Rechipper

OUR 75TH YEAR
75 YEARS OF SERVICE TO INDUSTRY
1883 TO 1958

D. J. MURRAY MANUFACTURING CO.

WAUSAU • WISCONSIN

Names in the News . . .

Div. (Rhinelander is a St. Regis subsidiary.)

John Shelendich has been named Union Div. superintendent for Thilmany Pulp & Paper Co. at Kaukauna, Wis. He will be responsible for all divisional activities, which include decorating, finishing, materials handling and paper tube production. Shelendich joined the firm in 1954 as staff assistant to the converting superintendent and was made decorating superintendent in 1957.

J. Shelendich

H. F. Zigmund

Harold F. Zigmund, formerly assistant to the executive vice president and general manager, has been made vice president in charge of manufacturing for Blandin Paper Co. of Grand Rapids, Minn. He was at one time on the staff of Mosinee Paper Mills Co. of Mosinee, Wis.

Bennie Burish has been named paper mill superintendent for Badger Paper Mills Inc. at Peshtigo, Wis. Technical superintendent since 1957, he replaces A. M. Dohr, who because of ill health has been relieved of the position at his own request. Dohr, however, will continue with the firm on special assignments.

Allied Personalities . . .

P. J. McNee Jr. of Waco, Texas, is now representing Appleton Machine Co. in the south central states. He was formerly central manager for Western Paper Co. in Waco. The south central territory includes Texas, Arkansas, Louisiana, Oklahoma and New Mexico.

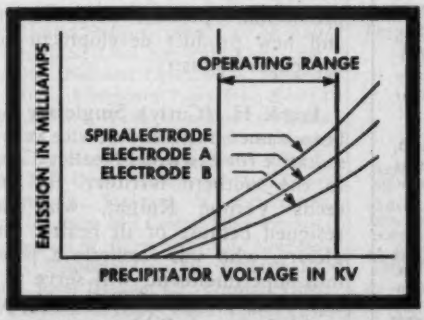
Chicago Bridge & Iron Co. has assigned two engineers to company sales offices in Chicago and Kansas City, Mo. **Harry G. Pazucha,** formerly of the general sales department, has joined the Chicago sales staff. **Richard J. Bassett** has been

1500 miles of Spiralectrodes in Precipitator Service!

That's real proof of superior performance. Over 1500 miles of these emitting electrodes have been installed in 'SF' electric precipitators . . . delivering 50 to 100% more electron emission than conventional types of electrodes.

There are sound reasons why Buell *Spiralectrodes* are providing superior emitting efficiency in actual dust collecting applications.

- *Spiralectrodes* are *"emission engineered"* – pitch and diameter are custom designed for each application . . . of critical importance with high resistivity dust.
- *Spiralectrodes are precision made from stainless steel*– of uniform quality, corrosion-resistant.
- *Spiralectrodes minimize efficiency-loss of dust build-up* –no horizontal surface to collect dust, positive rapping cleans electrodes.
- *Spiralectrodes maintain predetermined tension* – (no weights required) . . . dampen effect of vibration caused by electrical pulsation, thereby minimizing electrode breakage.
- *Spiralectrodes'* controlled area emission stops sparking effect of "point emission."



Above chart illustrates the superior emission of the Spiralectrode: its corona voltage is lower and its emission is higher than other types of emitting electrodes over the entire operating range of industrial precipitator voltage.

The superior operating characteristics of Spiralectrodes contribute to continued high efficiency of Buell 'SF' Precipitators. Detailed information of this and other exclusive features are described in a booklet, "Buell 'SF' Electric Precipitators." Send for your copy: write Dept. 56-J, Buell Engineering Company, Inc., 123 William Street, New York 38, New York.

buell®

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

IDEAL COMBINATION FOR ANY

Conical Refiner

Jones Adapta-Plug

The completely bandless plug for *all* Jordans, the Jones Adapta-Plug is also the strongest, most adaptable, most economical plug ever made.

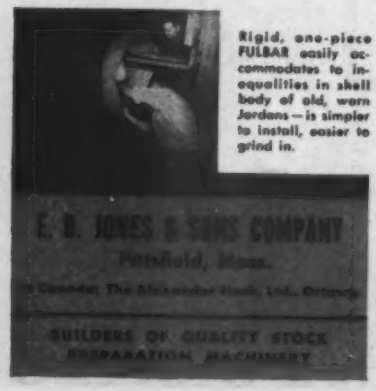
This revolutionary advance, exclusive with Jones, not only holds bars more securely, reduces slot wear and corrosion, but also cuts hours from the job of stripping and filling.

Before you replace another Jordan plug — ask your Jones representative about Adapta-Plug — or write us direct.

Jones FULBAR SHELL FILLINGS

Fulbar Shell Fillings eliminate keys and wedges. One piece construction fits shell body of any Jordan, simplifies handling, cuts installation time. And the patented No-wave pattern — also exclusive with Jones — has no sharp bar-ends to form strings or lumps.

For improved quality, more economical, trouble-free operation — make your next Jordan filling a FULBAR.



Rigid, one-piece FULBAR easily accommodates to inequalities in shell body of old, worn Jordans — is simpler to install, easier to grind in.

Names in the News . . .

transferred from the Salt Lake City, Utah plant to the Kansas City sales office.

Robert J. Jacobs, general manager of the Dilts Div. in Fulton, N. Y., has been appointed vice president of Black-Clawson Co. He has served in the Dilts Div. since joining B-C in 1919 and was manager of sales and engineering before becoming division manager in 1956.

Oliver G. Haywood has been elected vice president of F. C. Huyck & Sons. He was previously vice president of Emerson Electric Mfg. Co. of St. Louis and manager of the Electronics & Avionics Div. Haywood will serve on the Huyck corporate staff to coordinate company activities in instrumentation, servo controls, electronics, electro-mechanical devices and fluid systems.

Fred Buchanan, associated with the paper industry nearly 30 years, has joined the Special Commodities Div. of General Mills. He will represent the division in the sale of guar products. Buchanan was at various times associated with Crystal Tissue Co., Waldorf Paper Products Co. and National Gypsum Co.

Leslie S. Pearson, formerly industrial engineer with S. D. Warren Co., has become associated with Southworth Machine Co. of Portland, Maine, as manager of its Paper Mill Div. He will be responsible for sales promotion, product improvement and new product development for the paper industry.

Frank H. (Curly) Singletary has been named sales and service representative for Eastwood-Nealley Corp. in the southern territory. He succeeds Vernon Knight, who has resigned because of ill health. Singletary, who was formerly a paper mill superintendent, will serve as a team with Albert Hardaker, already established as an E-N representative.

Newton R. Crum of Long Beach, Cal., with long experience in the sale of machinery and parts, has been named manager of the Los Angeles office of Lunkenheimer Co. At the same time, **J. Paul Scherer,** formerly with American Standard Co., has been assigned to the New York, N. Y. office as a sales representative.

E. J. Justus, formerly director of research, has been named vice president in charge of research for Beloit Iron Works.

Necrology . . .

Robert S. Williams

Robert S. Williams, 36, paper mill superintendent for Marathon Southern Corp. at Naheola, Ala., died Sept. 5 following a short illness.

He was formerly superintendent of Marathon Corp.'s Canal St. plant in Menasha, Wis., and at the time of his death was supervising preliminary start-up adjustments at the new Alabama mill.

A native of Buffalo, N. Y., Williams was a graduate of Texas A&M College and had attended the Institute of Paper Chemistry in Appleton, Wis.

Spaulding S. Bisbee

Gen. Spaulding S. Bisbee, vice president, assistant treasurer and a director of Keyes Fibre Co. of Waterville, Maine, died unexpectedly recently at the age of 68.

General Bisbee had been associated with the firm 31 years and at the time of his death headed the Portland office. He was former commander of the Maine National Guard's 103rd Infantry and had served in both World Wars.

Oscar E. Larson, manager of the western sales region for John W. Bolton & Sons Inc., died recently in Oakland, Cal. He had been associated with the Bolton-Emerson companies 30 years and during the war served as plant manager of the Emerson Mfg. Co. Div. of Bolton.

T. Raymond Pierce, 79, president of the Wellesley Cooperative Bank in Wellesley, Mass., and a retired vice president and director of the former Robert Gair Co. Inc., died recently in Boston.

Joseph W. Walter, 82, until his retirement in 1955 secretary-treasurer and vice president of River Raisin Paper Co., died recently in Monroe, Mich.

Harry C. Campbell, 68, vice president of the Morris Paper Mills Div. of Federal Paper Board Co. Inc., died in August at his Evanston, Ill. home. He joined the staff of Morris Paper Mills 27 years ago.

SAFETY NEWS

6-Per Cent Decline Shown in NSC Contest's First Half

FOR THE SIX MONTHS ended July 31, some 171 contestants reported perfect scores in the 1958 Paper Industry Safety Contest sponsored by the National Safety Council. The number of contestants registered in the competition for the current year is 680.

Last year's six-month record was 137 perfect scores registered in a "field" of 602.

The January-July frequency rate for all divisions (except pulpwood logging) was 6.61, a 6-per cent decrease from the same period of 1957. In the Pulp and Paper Div. the six-month rate was 6.23, a decrease of 7 per cent from a year ago. In Paper Converting a rate of 8.39 meant a 4-per cent increase from the first six months of 1957. Pulpwood Logging reported a rate of 33.02—down 63 per cent from last year.

Contestants working the most man-hours in the January-to-July period without lost-time accidents were: Scott Paper Co., Chester, Pa.; Container Corp. of America, Philadelphia, and Munising Paper Co., Munising, Mich.

From the eligible mills in Division I the board of judges will choose the mill with the most outstanding record. This plant will be awarded the grand prize—the Edward Benton Fritz Memorial Trophy—during the National Safety Congress in October 1959. The trophy is presented each year by Fritz Publications Inc., publisher of THE PAPER INDUSTRY.

Perfect scores recorded for the January-July period were as follows:

Division 1—Pulp & Paper Mills

Group A

Scott Paper Co., Chester, Pa.

Group B

Container Corp. of America, Philadelphia; Munising Paper Co., Munising, Mich.; Marinette Paper Co., Marinette, Wis.; Brunswick Pulp & Paper Co., Brunswick, Ga.; Mead Corp. (Escanaba Paper Div.), Escanaba, Mich.; Chesapeake Corp. of Virginia, West Point, Va.; Owens-Illinois Glass Co. (Mill Div.), Valdosta, Ga.

Group C

Rome Kraft Co., Rome, Ga.; Schmidt & Ault Paper Co., York, Pa.; Restigouche Co. Ltd., Cambellton, N. B.; Falls Paper & Power Co., Oconto Falls, Wis.; Price Bros. & Co. Ltd., Jonquiere, Que.; Container Corp. of America, Wabash, Ind.; Fraser Companies Ltd., Newcastle, N. B.; Fibreboard Paper Products Corp. (Board Mill), Antioch, Cal.; Canadian Johns-Manville Co. Ltd., North Bay, Ont.; Pacific Coast Paper Mills of Washington Inc., Bellingham, Wash.; St. Regis Paper Co., Kalamazoo, Mich.

Group D

Certain-Teed Products Corp., East St. Louis, Ill.; Certain-Teed Products Corp., Savannah, Ga.; Congoleum-Nairn Inc., Cedarhurst, Md.; Mead Corp., Sylva, N. C.; Container Corp. of America, Carthage, Ind.; United States Gypsum Co., Clark Township, N. J.; United States Gypsum Co., Oakmont, Pa.; Fort Orange Paper Co. (Paper Mill), Castleton-on-Hudson, N. Y.; Central Fibre Products Co., Tama, Iowa; Certain-Teed Products Corp., Richmond, Cal.; Celotex Corp., Los Angeles; Strathmore Paper Co., Woronoco, Mass.

Group E

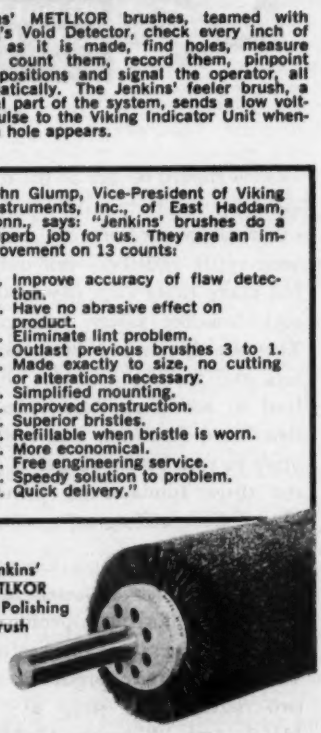
Bestwall Gypsum Co., Pryor, Okla.; Canadian Johns-Manville Co. Ltd., Asbestos, Que.; United States Gypsum Co., N. Kansas City, Mo.; Coos Bay Pulp Corp., Empire, Ore.; National Gypsum Co., Kalamazoo, Mich.; Fibreboard Paper Products Corp., Sumner, Wash.; Flintkote Co., Little Ferry, N. J.; Scott Paper Co., Madison, Maine; St. Regis Container Corp. (Muskingum Mill Div.), Conshocton, Ohio; Flintkote Co., Lockport, N. Y.; Celotex Corp., Madison, Ill.; Central Fibre Products Co., Denver; St. Regis Paper Co., Herrings, N. Y.; Flintkote Co., Mt. Carmel, Ill.; United States Gypsum Co., Gypsum, Ohio; American Writing Paper Corp. (Gill Div.), Holyoke, Mass.; Container Corp. of America, Wilmington, Del.; Banner Fibreboard Co., Wellsburg, W. Va.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Dresden, Ohio; Riegel Paper Corp., Riegelsville, N. J.; International Paper Co., Riley, Maine; Charmin Paper Products Co., Little Rapids, Wis.; Johns-Manville Corp., Tilton, N. J.; Rogers Corp., Manchester, Conn.; Rayonier Inc., Shelton, Wash.; Spaulding Fibre Co. Inc., Milton, N. H.; National Vulcanized Fibre Co. (Marshall Bros. Mill), Yorklyn, Del.; National Gyp-

PRIVATE EYES

Jenkins' METLKOR brushes, teamed with Viking's Void Detector, check every inch of paper as it is made, find holes, measure them, count them, record them, pinpoint their positions and signal the operator, all automatically. The Jenkins' feeler brush, a critical part of the system, sends a low voltage pulse to the Viking Indicator Unit whenever a hole appears.

John Glump, Vice-President of Viking Instruments, Inc., of East Haddam, Conn., says: "Jenkins' brushes do a superb job for us. They are an improvement on 13 counts:

1. Improve accuracy of flaw detection.
2. Have no abrasive effect on product.
3. Eliminate lint problem.
4. Outlast previous brushes 3 to 1.
5. Made exactly to size, no cutting or alterations necessary.
6. Simplified mounting.
7. Improved construction.
8. Superior bristles.
9. Refillable when bristle is worn.
10. More economical.
11. Free engineering service.
12. Speedy solution to problem.
13. Quick delivery."



Jenkins' METLKOR Paper Polishing Brush

Jenkins' also makes the following brushes for the paper industry:

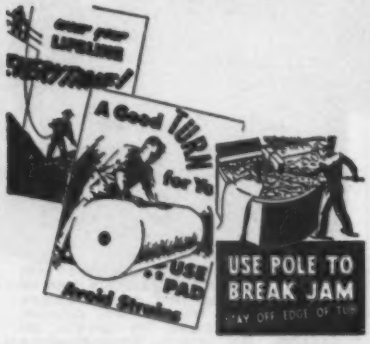
Conveyor Cleaning • Blanket Washer • Fourdrinier Wire Cleaning • Polishing • Coating • Dusting • Dampening • Spray • Sieve • Static Elimination • Flocking • Felt Cleaning • Feed or Carrier • Paint Brushes • Floor Sweeps

Specify Jenkins' METLKOR the original . . . the best *Metal* Core brush

METLKOR® CYLINDER BRUSHES and LIFEWOOD® WOOD BACKED BRUSHES

M. W. JENKINS' SONS, INC.
— Serving Industry for 80 Years —
442 Pompton Ave., Cedar Grove
Essex County, N. J. • CEnter 9-5150

POSTERS
— A POTENT SAFETY TOOL



Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in two sizes: "A" size, 8½"x 11½", and "B" size, 17x23". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.
Chicago 11, Illinois

Safety . . .

sum Co., Newburgh, N. Y.

Division II—Paper Converting

Paper Bags

Crown Zellerbach Corp., Los Angeles; Union Bag-Camp Paper Corp., St. Louis; St. Regis Paper Co. Ltd., Vancouver, B. C.; St. Regis Paper Co., Nazareth, Pa.; St. Regis Paper Co., San Leandro, Cal.; Pillsbury Mills Inc., Wellsburg, W. Va.; St. Regis Paper Co., Kansas City, Mo.

Boxes and Cartons

Group A

Michigan Carton Co., Battle Creek, Mich.; Fibreboard Paper Products Corp., Stockton, Cal.; Container Corp. of America, Valley Forge, Pa.; Fibreboard Paper Products Corp., Vernon, Cal.; Robertson Paper Box Co. Inc., Montville, Conn.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Atlanta; Green Bay Box Co. (Corrugated Div.), Green Bay, Wis.

Group B

American Can Co. (Marathon Div.), Modesto, Cal.; Container Corp. of America (Folding Carton Plant), Philadelphia (Manayunk), Pa.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), Milwaukee; Mengel Co., Louisville, Ky.; Container Corp. of America (Boyle Ave. Plant), Los Angeles; Container Corp. of America (Container Div.), Chattanooga, Tenn.; Owens-Illinois Glass Co., Jacksonville, Fla.; St. Regis Paper Co. (Cleveland Corrugated Box Co.), Cleveland; St. Regis Container Corp. (Superior Paper Products Co. Div.), Mt. Wolf, Pa.

St. Regis Container Co. (Dubuque Container Co. Div.), Dubuque, Iowa; Hoerner Boxes Inc., Sand Springs, Okla.; Owens-Illinois Glass Co. (Box Plant), Los Angeles, Cal.; Container Corp. of America, Oakland, Cal.; Container Corp. of America (Carton Div.), Chattanooga, Tenn.; Mengel Co., Fulton, N. Y.; Container Corp. of America (Carton Div.), Seattle; Container Corp. of America (Carton Div.), Cleveland; Fibreboard Paper Products Corp. (Container Plant), Sumner, Wash.; Fibreboard Paper Products Corp. (Container Plant), Antioch, Cal.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Rochester, N. Y.; Container Corp. of America, Baltimore; Container Corp. of America, Greensboro, N. C.; Container Corp. of America (Carton Div.), Seattle; Dairypak Inc., Clinton, Iowa; Owens-Illinois Glass Co., Salisbury, N. C.; Crown Zellerbach Corp. (Gaylord Container Corp. Div.), San Antonio, Texas.

Wilson Paper Box Mfg. Co. Inc., Richmond, Va.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Austin, Minn.; Container Corp. of America, Muskogee, Okla.; Albany Corrugated Container Corp., Cohoes, N. Y.; International Paper Co. (Bagpak Div.), Bastrop, La.; Dairypak Inc., Athens, Ga.; Container Corp. of America (Container Div.), Cleveland; American Can Co. (Marathon Div.), Sunnyside, Wash.; St. Regis Container Corp. (Hunt-Crawford Div.), Coshocton, Ohio; American Can Co. (Marathon Div.), Newnan, Ga.; Bradley & Gilbert Co., Louisville, Ky.; Dairypak Inc., Fort Worth, Texas; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Detroit; International Paper Co. (Single-Service Div.), Minneapolis; International Paper Co. (Single-Service Div.), Waco, Texas; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Tampa, Fla.; International Paper Co. (Single-Service Div.), Youngstown, Ohio.

St. Regis Paper Co. (Niagara Corrugated Container Div.), Buffalo, N. Y.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Hastings, Nebr.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Carpentersville, Ill.; Weyerhaeuser Timber Co. (Kieckhefer-Eddy Div.), Seymour, Ind.; International Paper Co., Geneva, N. Y.; Fibreboard Paper Products Corp. (San Joaquin Div.), Antioch, Cal.; International Paper Co., Houston, Texas.

Roofing Paper

Certain-Teed Products Corp., Chicago Heights, Ill.; Ruberoid Co., Erie, Pa.; Allied Chemical Corp. (Barrett Div.), Elizabeth, N. J.; Ruberoid Co., Millis, Mass.; Celotex Corp., Cleveland; Johns-Manville Corp., Marrero, La.; Flintkote Co. (Pioneer Div.), Portland, Ore.

Ruberoid Co., Minneapolis; Certain-Teed Products Corp., Tacoma, Wash.; Fibreboard Paper Products Corp., Wilmington, Cal.; Fibreboard Paper Products Corp., Portland, Ore.

Insulation and Building Board

Johns-Manville Corp., Jarratt, Va.; Flintkote Co., Hilo, H. I.; Oregon Lumber Co., Dee, Ore.

Specialties

Crown Zellerbach Corp. (Western Waxide Paper Div.), San Leandro, Cal.; Lily-Tulip Cup Corp., Augusta, Ga.; Container Corp. of America (Sefton Fibre Can Div.), St. Louis; Old Colony Envelope Co., Westfield, Mass.; Crown Zellerbach Corp. (Western Waxide Paper Div.), St. Louis; St. Regis Paper Co. (Gummed Products Co. Div.), Troy, Ohio; Container Corp. of America, Portland, Ore.; Kimberly-Clark Corp., Appleton, Wis.; Bay West Paper Co., Green Bay, Wis.

Kimberly-Clark Products Ltd., Winnipeg, Man.; Container Corp. of America (Sefton Fibre Can Div.), Oakland, Cal.; Mid-West Wax Paper Co., Fort Madison, Iowa; Lily-Tulip Cup Corp., Chicago; Lily-Tulip Cup Corp., Brooklyn, N. Y.; Lily-Tulip Cup Corp., Galva, Ill.; Pollock Paper Corp., Houston, Texas; Lily-Tulip Cup Corp., Monticello, Ind.

Division III—Pulpwood Logging

Continental Can Co. (Southern Advance Bag Operations), Hodge, La.

Meetings of the Pulp & Paper Section during the National Safety Congress in Chicago will be at the Conrad Hilton Hotel. The Congress is set for October 20-23.

(Turn to Page 496)

FOREIGN ABSTRACTS

Paper from pulp oxidized with periodic acid

This is the tenth of a long series of articles involving the structure and the properties of paper made by members of the Division of Forest Products, Melbourne, Australia. The eucalypts pulp used was high in α-cellulose and had an average weight degree of polymerization of 310.

The studies included infra red (I.R.) spectroscopy on the nature of the oxidation and also the effects on the physical properties of the paper made from the oxidized material. Various oxidizing conditions were used, but the pH was usually about 2.0. The oxidations were carried out both under illumination and in the dark. In either case the oxidations followed the same general course, but the apparent periodic acid consumptions were very different.

The results of studying the I.R. spectra are discussed critically and fully, and the following information was obtained: (1) There is a development of carbonyl groups. (2) Ring fission occurs. (3) The carbonyl groups are hydrated. (4) Secondary hydroxyl groups are oxidized. (5) Reactions also take place on carbon atom number six (of the glucose units). (6) Carboxyl groups appear after extensive oxidation. (7) The extent of hydrogen bonding becomes manifest. (8) As oxidation proceeds, there is an attack on the crystallites. (9) There is a higher rate of apparent consumption of the oxidant in the light than in the dark, despite a similar course of oxidation. The rheological properties of sheets made from this oxidized cellulose were studied under varying degrees of oxidation, both before and after drying. Under stress, the undried sheets showed that oxidation did not give wet strength increases corresponding to those found when the sheet was first dried and then rewetted; hence the drying step is essential. Sheet properties changed markedly with increasing degrees of oxidation (The untreated pulp was used as control). These changes are indicated in Fig. 1.

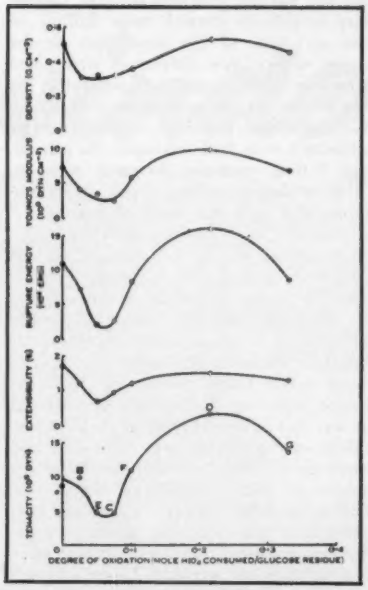

DENSITY (G CM⁻³)
YOUNG'S MODULUS (10⁹ DYN CM⁻²)
RUPTURE ENERGY (10⁶ ERG)
EXTENSIBILITY (%)
TENACITY (10⁸ DYN)
DEGREE OF OXIDATION (MOLE HIO₄ CONSUMED/GLUCOSE RESIDUE)

Fig. 1

There is an initial drop in strength, due apparently to a decrease in density resulting from the effects of acid hydrolysis on the surface of the fiber. When the oxidation was carried far enough to open up the fiber structure, there is an attack on the crystallites, which is indicated both by I.R. spectra and by swelling experiments. At this point the strength properties increase and certain of the values (as shown in the figure) are in excess of those of the untreated pulp. However, such sheets have lower extensibility, are brittle and have poor folding endurance. As the oxidation goes beyond this point, the fibers suffer serious degradation, due both to oxidation and hydrolysis. There are marked decreases in strength, especially in tenacity and rupture, even when the interfiber bonding capacity remains fairly high. For example, an oxidized sample dried in bulk was dense, hard and quite resistant to water. The maximum paper strength was obtained at an *apparent* oxidant consumption (in the dark) of about 0.2 mole HIO_4 per glucose unit. This so-called oxidant consumption, however, is simply used as reference and does not mean that the tabulated values represent an *actual* consumption of this amount by the pulp.

Forty-five references, two tables and five figures are given. H. G. Higgins and A. W. McKenzie. *Australian J. Applied Science* 9, No. 2, 167-82 (1958).

Kraft pulps from mixed hardwoods of Brazil

Although there are many sub-tropical hardwood species in Brazil, mixed woods taken from the virgin forests (when pulped by the sulfate process) gave such a heterogeneous mixture that the yields, degree of pulping and the shive contents were often subject to wide variations.

In the present study an attempt was made to find those pulping conditions that would furnish pulps of high brightness. Thus, a wood mixture from 11 frequently-occurring species was subjected to kraft pulping under a variety of conditions. The variables of pulping period, maximum temperature and alkali concentration were varied one at a time, and the results were checked with regard to bleachability. The study showed that easy bleaching pulps could be obtained only by limiting the cooking period at maximum temperature to the very minimum, and by keeping this maximum temperature just as low as possible.

The results are given in fully-tabulated data. The actual concentration of alkali had relatively little effect on the results, and in a variety of experiments, the bleached pulps all showed rather similar properties. It was quite possible to obtain pulps with a G.E. brightness of over 80. An example of the pulping conditions is the following: Using 16 per cent Na_2O based on the wood, a maximum temperature of 165° C., keeping the digestion only 15 min. at this temperature, an unbleached pulp yield of about 55.5 per cent was obtained after shive removal. This pulp retained 9.48 per cent lignin and required 15.3 per cent chlorine, yielding a bleached pulp with 84 G.E. units of brightness. In other instances, this bleach consumption was materially reduced with marked decrease in the over-all yields of unbleached pulp and with a higher shive content. The study was made in pilot plant operations at *Industrias Klabin do Parana de Cellulose* S/A at Monte Alegre, Brazil.

Six graphs and nine tables are included. Wilhelm Overbeck and Cyro Agottani. *Das Papier* 12,371-378 (1958) (in German).

Fluffing (or dusting) of paper

The term "fluffing" or "dusting" is defined as the removal of loosely held particles from the surface of a sheet of paper by means of rubbing, folding, shaking or percussion. Such particles may be fibers and fiber fragments, fillers, rosin, *et al.* This fluffing is differentiated from "plucking" or "picking" in which tractive forces, often applied perpendicularly to the paper surface, cause particles to be torn away (as in the case of printing), thus leaving an irregular or blistered surface.

Various methods that might be applied in the determination of fluffing are reviewed, but none of these appeared to be satisfactory in the present study. Consequently the authors devised a new and relatively simple technique and a new apparatus, which is described in detail. In a suitable housing, a central, vertical arm carries four brushes made of Perlon. This arm can be rotated at various speeds, and each brush strikes and removes fluff from the paper to be tested. The paper samples are attached to revolving bolts, two of which are mounted in the housing parallel to the central rotor. The brushes are so placed that 50 square centimeters of each paper surface is rubbed 2000 times (*i.e.* 8000 contacts in all), whereupon the test is ter-

minated. The central rotor carrying the brushes revolves at 700 rpm, a speed determined upon after various experiments. The loosened dust is trapped by means of three initially-weighed discs covered with velveteen, each of which is held at the base of a long rod. Usually only two such micro-dust collectors are required. All weighings are made on a micro-balance, and the weight differences (before and after the test) are recorded in micrograms. By these means 51 commercial printing papers were tested and the data tabulated. In 34 instances, the fluffing results were compared with the subjective estimates made by printers using these papers, and often the agreement between their reports and the results of the test were very good.

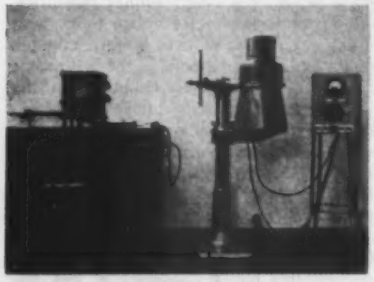


Fig. 2

However, there were some disagreements that have not been explained.

Fig. 2 shows the assembled apparatus. At the very center is a long rod, at the lower end of which the micro-dust collector is fastened. A micrograph of fluff from a paper subject to extreme dusting is shown in Fig. 3.

Fig. 3

In many instances, the following data were also obtained on the test samples: basis weight, volume, thickness, gloss, air-permeability, absorptivity both in the machine and cross-machine directions, and percentage ash. Both the wire and the upper sides of the paper wese tested for fluffing, as well as samples taken in the machine and cross-machine directions. A number of general conclusions were reached, and only a few of these are given here. The least fluffing was often noted with heavy offset or coated paper, the greatest fluffing with bulky book papers. The printing methods used must be considered in gaging the value of an objective fluffing test. The upper side of the sheet often showed the greater fluffing tendency, but this was not invariably the case. Laboratory handsheets showed more fluffing on the wire side of the sheet than on the upper surface. Few differences were noted when the paper sample used was cut in the machine or in the cross-machine direction. No one paper property could be directly correlated with fluff formation. In general, the fluffing tendency decreased with increasing density, gloss, or air impermeability, and with the degre of beating.

The effects of various operating conditions during paper manufacture on the degree of fluffing are discussed. Included are: the degree of beating; the use of dry or wet pulps, and the addition of varying amounts of kaolin as filler. In this study bleached straw kraft, spruce sulfite and beech sulfite pulps were used. Their behavior regarding fluffing was also studied as was that of several types of groundwood. Effects of calendering and sizing were also investigated. With unbeaten stock, in the absence of fillers, this showed the greatest fluffing tendency, and the higher the filler addition to this stock, the greater was the fluffing. Pre-dried pulps often caused more fluffing than did wet laps. Under identical conditions of loading with kaolin, the least fluffing was noted with straw pulp and the most with beech pulp, but these results varied when loading conditions were also varied.

Six tables, 15 figures and 24 references. W. Brecht and C. Globig. *Das Papier* 12, 253-266; 358-368 (1958) (In German).

Planning installations in the pulp and paper industry

Using the paper industry simply as an example, the author discusses at some length and gives specific examples of how small and medium size existing mills can be enlarged and how, by careful planning,

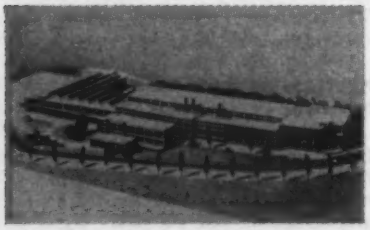


Fig. 4

large plants should be built. He states that in Germany this idea of careful "general planning" is not widely known. By means of ground plans, models and aerial photographs he illustrates his views on the general subject (which can of course also be applied in the case of other industries).

For example, Fig. 1 shows the proposed addition to a medium sized printing paper mill now operating in Italy. The older area, not shown in the model, is given on a ground plan (not included in this abstract). Fig. 4, viewed from right to left, shows a unit in which stock and filler preparation will be housed. This leads (in the back) to the new machine room; in front of this is the unit for pulp storage and the units for steam turbines, electrical equipment, boilers and supercalenders. In the forefront is the building for a laboratory, and at the very front of this is an office building. At the extreme left of the model and adjoining the main buildings is a two-story building to be used for any new installations, for storage and to house a shipping department.

Effects of drying wood and pulp on pulp quality

A study was made of the strength properties of mechanical pulp made from spruce containing 27.5 and 40.3 per cent moisture but otherwise of the same origin and receiving the same treatment. The wood having the higher initial moisture content gave the superior pulp, as indicated in Table I. The properties of Asplund pulp and a softboard made from three different sources of spruce were investi-

TABLE I

PFI quality data for groundwood produced from wood of different moisture content.

Moisture content, % (o.d. base)	40.3	27.5
% retained, 25 mesh	23.4	18.9
Breaking length, m	2500	2130
Burst factor	10.6	9.3
Tear factor	38.9	33.4
Log MIT folding number	2.35	1.90
°SR	68	69

gated. Spruce slabwood that had been dried over a long period of storage required a treatment different from that accorded a green wood, so as to produce a suitable pulp. On the other hand air-dried, unstored wood behaved more like the green wood. When birch neutral sulfite semi-chemical pulp was dried at 105° C and then beaten in a P.F.I. mill, it regained its full strength and Concora stiffness. This is indicated in Fig. 5.

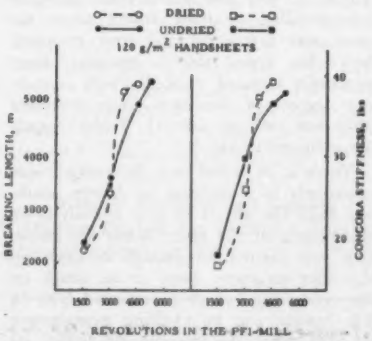


Fig. 5

One table and six figures are included. H. P. Dahm, J. Brandal and K. Helge. *Paperi ja Puu* (Finland) 40,355-360 (1958) (in Swedish with English summary. Legends accompanying the graphs are also given in English).

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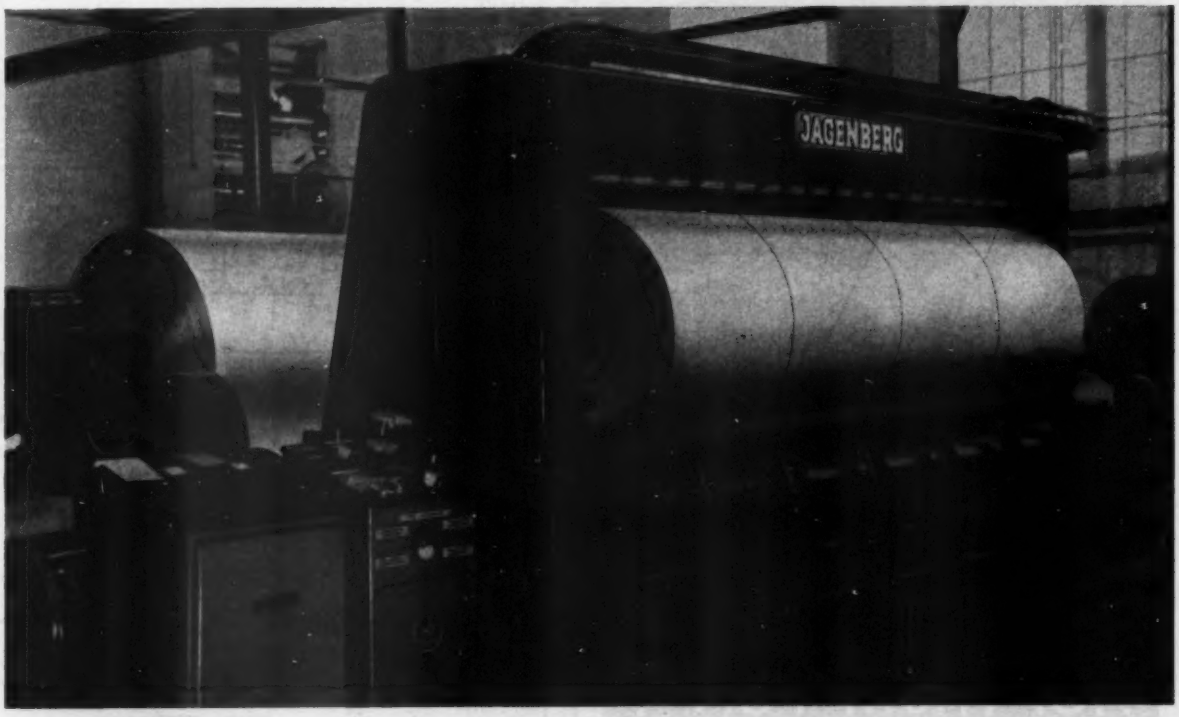

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PATENT REVIEWS

MELVIN NORD*

Recovery of lignin from black liquors

U.S. 2,828,297, issued March 25, 1958, to Johann Giesen, assigned to Inventa A. G. fur Forschung und Patentverwertung, describes a process for recovering lignin from black liquors.

The process consists of continuously advancing the black liquor through a circulating system while subjecting the advancing liquor to carbon dioxide in two successive stages. In the first stage the black liquor is saturated with carbon dioxide at a temperature of about 10°-30°C and under pressure. In the second stage the black liquor is treated with carbon dioxide at a temperature of about 100°-120°C and under pressure to precipitate out the lignin from the black liquor.

Apparatus for drying webs of pulp

U.S. 2,829,567, issued April 8, 1958, to Alois Staudenmaier and assigned to Escher Wyss G.m.b.H., describes an apparatus for drying webs of pulp on sieves of drying machines.

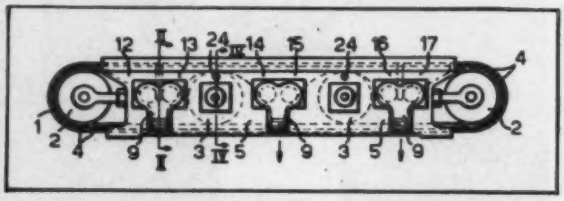


Fig. 1

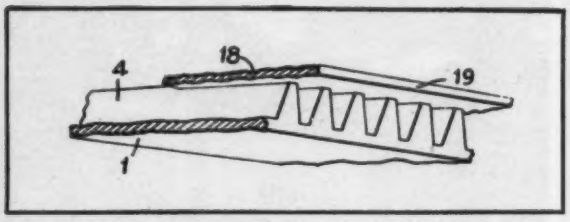


Fig. 2

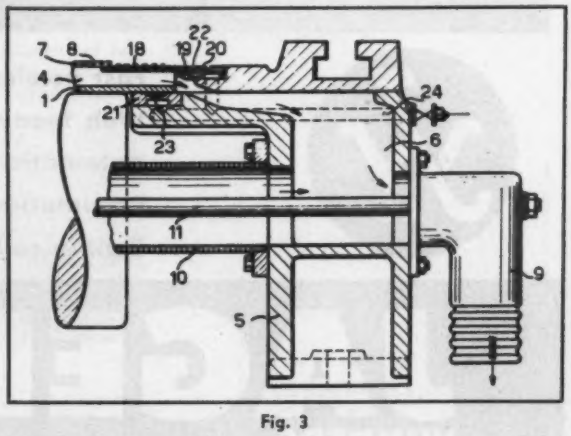


Fig. 3

As shown in Figs. 1-3, the apparatus consists of an elastic endless apron 1 that is passed over two rollers 2 and is supported between these rollers on two supporting rollers 3. The apron 1 has tranverse ribs on its upper face, between which ribs are open-

*Patent attorney, 17600 Pinehurst, Detroit 21.

topped grooves 4 extending across the width of the web. Laterally adjacent plates 5 are designed as suction heads, by which the water accumulating in the grooves 4 is sucked off in the drying of a pulp web 8 passed over an endless sieve cloth 7. The connecting pieces 9 establish the connection to a suction pump.

In the case of narrow paper machines unilateral suction is sufficient. In the case of wide machines, however, the suction will take place on both sides. In the constructional form of the drying apparatus, as illustrated in Fig. 2, a tube 10 is provided to connect the suction head 6 to the similar and opposite suction head.

Wallboard product

U.S. 2,826,522, issued March 11, 1958, to Willard C. Mattson, describes a method of manufacturing wallboard having a density between 0.5 and 1.0.

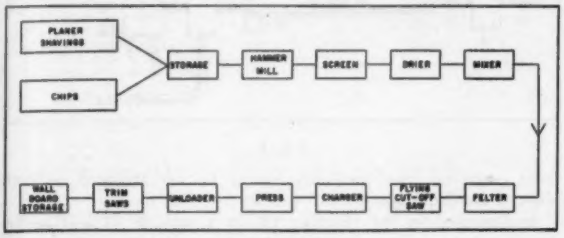


Fig. 4

As indicated in Fig. 4, the process consists of the following steps: Feeding wood shavings or chips into a hammermill, where the particles of wood are reduced to a more or less common size; screening the particles from the hammermill and retaining the particles of desired dimensions; drying these particles until they have a desired moisture content, mixing the particles with a binder solution; depositing the mixture in a blanket form on belts, cutting the blanket of material into sections of given length and placing them in a press where they are subjected to a certain amount of heat and pressure for a fixed time. After the pressing operation, the boards are completed and need only be trimmed to pre-determined size.

The wallboard produced has many uses such as wall panelling, sheathing, sub-floors and veneer stock. The physical properties of the product are such that it will not warp or split, and it will ignite only when subject to intense heat. The board in its natural state is water repellent and may be treated or covered to make it waterproof. The board will not absorb and disperse a liquid throughout its body if exposed thereto the way a blotter does. For instance, if a portion of this board is permitted to stand in water for some time, only that portion actually in contact with the water will absorb the water, and the rest of the board will remain dry. The board is resistant to denting, scratching or other marring, yet can be painted, have veneers applied thereto, paper, plaster or other covering materials. The wallboard has good insulating characteristics and may be sawn and have nails or screws applied thereto the same as lumber.

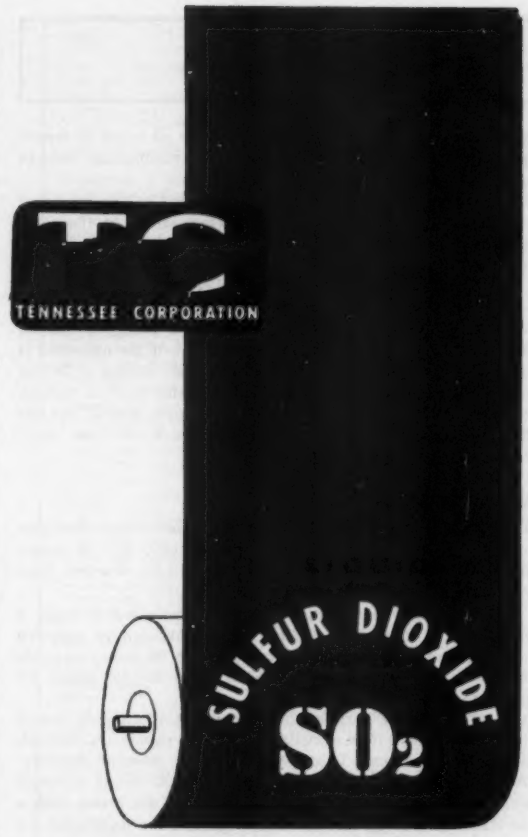
The binder solution contains 2-4 per cent phenolic resin, 2-4 per cent wood or ethyl alcohol, 3-5 per cent petrolatum and 2-4 per cent glycerine.

Sized paper

U.S. 2,830,916, issued April 15, 1958, to Frank A. Brown and assigned to National Dairy Products Corp., relates to the more efficient use of starch in sizing paper.

It has been discovered that the amounts of starch that are used can be substantially reduced by the use of carragheen and carragheenin while at the same time providing a sheet of corresponding quality and providing improvements in the manufacture of paper. On the other hand, through the use of carragheen or carragheenin larger amounts of starch can be used because of some synergistic action that prevents the starch from becoming tacky. Thus, the carragheen or carragheenin is not used as a substitue for starch but rather is employed as an extender of the starch so that lesser amounts of starch may be employed.

The starch-carragheen or carragheenin sizes provide sheets that have excellent printability, and in the manufacture of the sheets there is a substantial reduction of tackiness and picking. In addition, the carragheen and carragheenin are not sensitive to calcium



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ion and consequently can be used in practically all types of waters in paper mill operations. Furthermore, this combination reduces warpage of the sheet or board.

The carragheen or carragheenin may be added to the beater in paper manufacture or may be used in surface sizing of the sheet or board prior to or after calendering.

In order to prepare starch for sizing, the starch is made into a slurry and heated to a temperature just below boiling for a period of 15-20 min. If carragheen is used, it should be added to the starch slurry and cooked at a temperature above 120°F for a time not less than about 15 min. On the other hand, if carragheenin is employed, the carragheenin may be either added during or before cooking of the starch, or it may be added after the starch is cooked.

The sizing agent for application to the paper should contain carragheen or carragheenin in the ratio to starch of from about 0.01-0.15:1 (on a weight basis).

Digestion process

U.S. 2,828,253, issued March 25, 1958, to Hans Kurz, describes a process for continuous digestion of wood, straw, etc., by means of alkaline lye and chlorine generated by electrolysis of a salt solution in contact with the material to be treated.

As shown in Fig. 5, the stock is continuously fed through a feedpipe 10 to a mixer 12, which is also continuously supplied with a sodium chloride solution, through pipe 36 from a supply container 11. Additional liquid is recirculated to the mixer 12 through a pipe 30.

In the mixer 12 the various components are thoroughly mixed to a material of semi-fluid consistency that is passed on through conduit 13 to a container 14 consisting of two reaction chambers 141 and 142 separated by a diaphragm. The container is mounted on insulators 37. The chamber 142 is coated on the inside with a chlorine-resisting coating 40. In order to protect the diaphragm 15

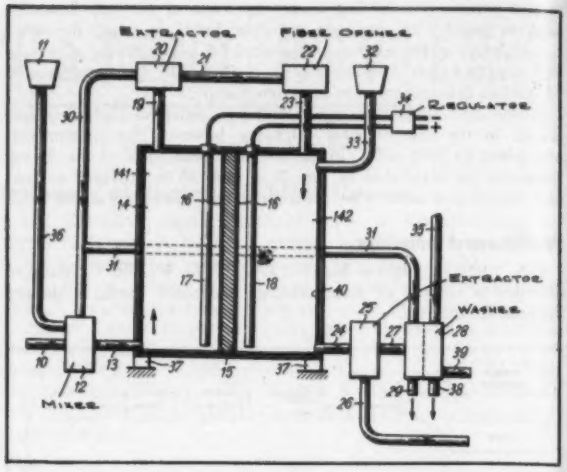

Fig. 5

from corrosion, two protecting sheets 16 are arranged on both sides of the diaphragm 15.

Incorporated in the chamber 141 is a cathode 17 and in the chamber 142 an anode 18. Both are supplied with electric energy from a dc source not illustrated in the drawing. The current and thus the electrolysis is controlled through a regulator 34.

From the top portion of chamber 141 a pipe 19 leads to an extracting unit 20 connected through pipe 21 with an opening unit 22, in which the fibers of the stock are opened by mechanical means.

The unit 22 is connected with chamber 142 by a return conduit 23. The required salt solution is continuously supplied to chamber 142 from a supply tank 32 through pipe 33. Near the bottom of chamber 142 an outlet pipe 24 is arranged that connects chamber 142 with an extractor 25, equipped on its bottom with an outlet conduit 26. A main pipeline 27 connects the extractor 25 with a multi-stage washer 28 from which the stock is supplied through conduit 39 to further installations, where it is subjected to final treatment.

Conduit 31 connects the first stage of washer 28 with conduit 30. The effluent of this first washer stage flows out through conduit 29. The additional washer stages (only one is indicated in the drawing) are supplied with water through a pipe 35 with the water leaving the stage through a pipe 38.

The operation of the apparatus is as follows:

In the mixer 12 the stock is mixed with a common salt solution and return liquid from the extracting unit 20. Through the main line 13 the stock is supplied to the reaction chamber 141, where caustic soda is continuously produced, the caustic soda reacting with the stock. The stock acted upon by the caustic soda is passed on from the chamber 141 through conduit 19 to the extracting unit 20, where the greater part of the liquid is extracted. This liquid is in part supplied to the mixer 12 through conduit 30 and in part to the first stage of the washer 28 through conduit 31 branching off from conduit 30.

From the extracting unit 20 the stock enters through conduit 21 an opening unit 22, wherein the vegetable fibers are mechanically opened up as far as is possible at this stage of the process.

From the opening unit 22 the stock travels to the reaction chamber 142 of container 14, where the chlorine produced by the electrolysis acts upon the penetrated stock. The common salt solution in this chamber is continuously supplemented from a supply container 32 through conduit 33. Through the outlet pipe 24 the digested stock is passed onto the extractor 25, where the major part of the liquid is extracted. This latter liquid contains, among other compounds, active chlorine, which may be employed for producing a suitable bleaching lye. The stock then travels to a multi-stage washer 28 (two stages being indicated in the drawing). In the first stage the stock is treated with extracted liquid coming from the extracting unit 20 through conduit 31, mainly for the purpose of reacting with the chlorine lignin produced through the chlorine process. The treating liquid leaves the first washer stage through conduit 29 and is then passed on to evaporating, drying and burning installations with the result that the energy and the chemical compounds contained therein may be reutilized for the

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continuous digestion process, e.g. in the form of heat, steam or electric energy. In the remaining stages of the washer the stock is subsequently treated in a conventional manner.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Collapsible container carrier	Annette P. Weiselberg	2,828,047	3/25/58
Carrying tray	Crown Zellerbach Corp.	2,828,059	"
Reclosable carton	National Paper Box Ltd.	2,828,060	"
End closure for a multi-sided carton	Jagenberg-Werke A. G.	2,828,061	"
Projecting structure for storage containers	Bankers Box Co.	2,828,062	"
Box with attached handle	Diamond Match Co.	2,828,063	"
Box and handle	Diamond Match Co.	2,828,064	"
Paper-drying machine	George S. Brendel et al	2,828,552	4/ 1/58
Machine for removing and replacing container caps	Sutherland Paper Co.	2,828,593	"
Apparatus for continuously forming a fibrous web from a liquid suspension and progressively removing liquid from it	Stewart E. Seaman	2,828,675	"
Carton	Ever-Dry Corp.	2,828,856	"
Carton with integral tubular liner	Diamond Match Co.	2,828,902	"
Foldable cartons	Somerville Ltd.	2,828,904	"
Foldable cardboard box and fasteners	James O. Frizzell et al	2,828,905	"
Continuous winder for web materials	Black-Clawson Co.	2,828,926	"
Latch for reusable paperboard boxes	Pak-Rak Inc.	2,828,990	"
Cushioned white water shower cleaner for paper machines	Arthur E. Broughton	2,829,005	"
Pulp forming die	Chaplin Corp.	2,829,568	4/ 8/58
Manufacture of corrugated board having tear strips	Clifford D. Keely et al	2,829,701	"
Utility stand for suction cleaner tools	Hoover Co.	2,829,778	"
Laminated boxes	Copeman Laboratories Co.	2,829,815	"
Display devices	William E. Jason	2,829,816	"
Cake box	Item Development Engineering Associates	2,829,817	"
Returnable envelope	Reese F. Alsop et al	8,829,818	"
Method of coating and smoothing paper	Mead Corp.	2,829,980	"
Alligator pattern paper	Riegel Paper Co.	2,830,005	"
Device for applying covers to receptacles	Sutherland Paper Co.	2,830,419	4/15/58
Apparatus for continuously forming tubes	Black-Clawson Co.	2,830,503	"
Bag valving and sleeving machine	Virginia-Carolina Chemical Corp.	2,830,504	"
Method of forming cartons	Waldorf Paper Products Co.	2,830,505	"
Manufacture of semi-rigid, corrugated paperboard cartons	St. Regis Paper Co.	2,830,506	"
Carton-erecting machine	Ohio Boxboard Co.	2,830,507	"
Roller apparatus for coating paper	Minnesota & Ontario Paper Co.	2,830,555	"
Log debarker	John J. Uhlenkott	2,830,630	"
Combined shipping and display carton	Brown-Forman Distillers Corp.	2,830,697	"
Can carton with handle	Container Corp. of America	2,830,726	"
Bottle carrier	American Box Board Co.	2,830,727	"
Beverage bottle case	Clifford R. Brackett	2,830,729	"
Partition structure for containers	Stone Container Corp.	2,830,749	"
Bag	Bemis Bros. Bag Co.	2,830,750	"
Apparatus for automatically controlling the paper feed speed in large paper bag machines	Windmoller and Holscher	2,830,811	"
Crepe paper insulation	General Electric Co.	2,831,050	"
Milk container	Michael A. Lavigne	2,831,623	4/22/58
Machine for setting up bottle cartons	Mead-Atlanta Paper Co.	2,831,681	"
Machine for folding and cementing paper articles	John L. Yonkers	2,832,269	4/29/58
Folding box assembly machines	Baljak Corp.	2,823,270	"
Continuous shaping of tubes from a web of paper	Hermorion Ltd.	2,823,271	"
Can carton with handle	Container Corp of America	2,832,504	"
Container cover	Keyes Fibre Co.	2,832,522	"
Leak-proof paper container	Jagenberg-Werke A. G.	2,832,523	"
Form-fit shipping carton	Carolina Container Co.	2,832,525	"
Foldable boxes	Owens-Illinois Glass Co.	2,832,526	"
Folding box	Alton Box Board Co.	2,832,527	"
Liquid rosin sizes	American Cyanamid Co.	2,832,692-3	"
Means for testing paper filters	C. A. V. Ltd.	2,833,140	5/6/58
Container nesting method	Ex-Cell-O Corp.	2,833,185	"
Bale of strip material	Fibreboard Paper Products Corp.	2,833,403	"
Shipping bundle	General Foods Corp.	2,833,404	"
Apparatus for loading pulpwood logs	Arnold H. Paananen	2,833,433	"

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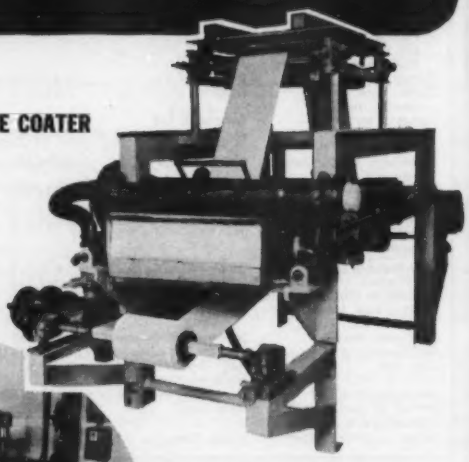

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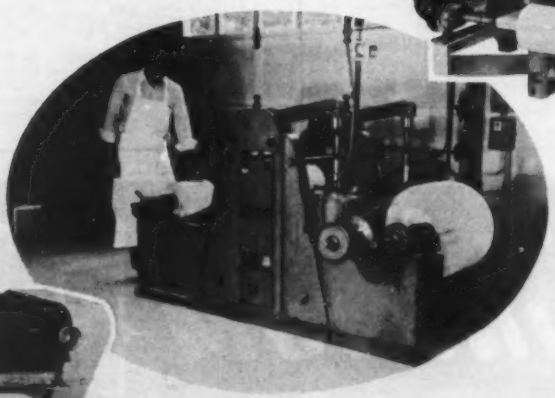

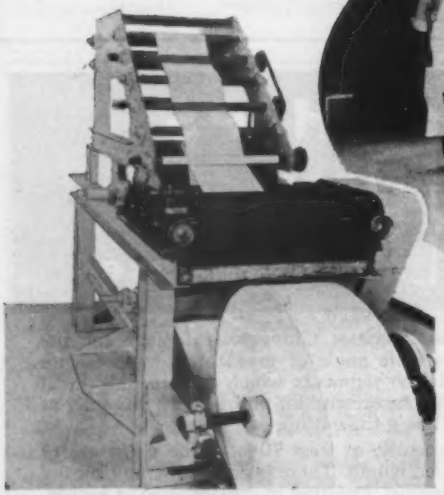

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Two new sealers for steel strapping

C11C10 and C11D10 are two new sealers that have been added to the Acme Steel line of tools for steel strapping. Both are lightweight, easily positioned and provide unusually efficient sealing action, states the company.

The C11C10 sealer produces a single set of notches in the seal with each stroke of the handle. The C11D10 sealer makes a sealed joint consisting of a double set of reverse notches with each stroke of the operating handle. *Acme Steel Co.*

Circle No. 12 on Readers' Service Card

Increasing sheet width

Stretching the sheet during drying operations with a Mount Hope Vari-Bow roll is said to make possible substantial increases in width with no increase in manufacturing costs.

The Vari-Bow roll is mounted ahead of or within the dryer section of a paper or board machine to provide a wide, workable web. *Mount Hope Machinery Co.*

Circle No. 13 on Readers' Service Card

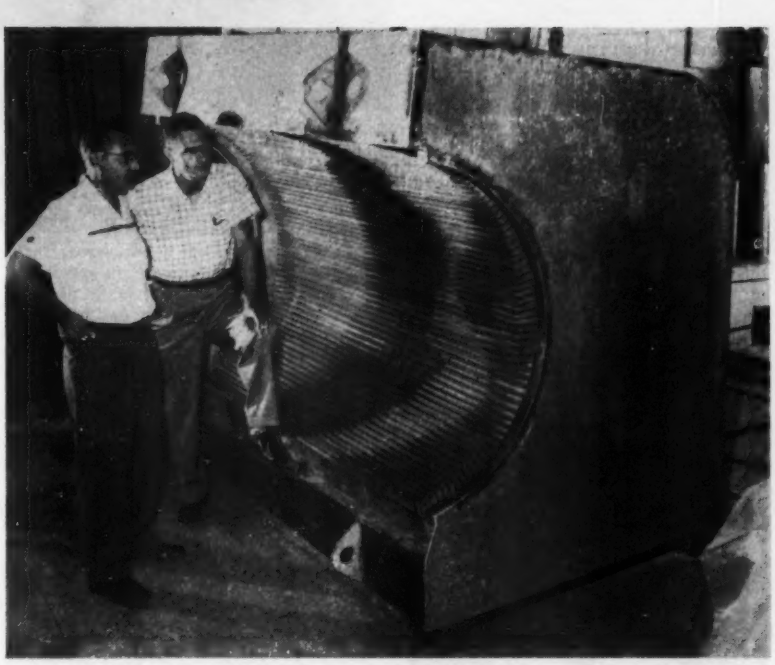
Glass valves

Both 2-in. and 1½-in. all-glass Y-type valves are now in production and available from stock.

The company has stated that the valves are virtually impervious to corrosion. All working parts of the valve exposed to fluid are of glass or Teflon. Temperatures as high as 250° F can be handled by the valves. Maximum line pressure is 50 psi.

The valves will fit into any system of process piping where valve corrosion and erosion are problems. *Corning Glass Works.*

Circle No. 14 on Readers' Service Card



Paper dryer

A drying system has been developed that is stated to be five times more effective than other drying methods, and the heat mass transfer is 92-per cent efficient.

Eight of these units now in operation across the country are used in all three major paper operations—primary drying of paper; drying coated paper, and drying ink and glue.

The dryer is essentially composed of a drying unit containing a large number of nozzles held close to the web coming off the paper machine, coater or press and an air conditioning system. Air is forced through the minute nozzles at a terrific speed and high temperature.

The company welcomes your request for more technical information concerning this new dryer. *Overly's Inc.*

Circle No. 15 on Readers' Service Card

Grouting material

A new high-strength, chemical-resistant grout has been developed especially for grouting machinery where vibration and other operating conditions are unusually severe.

Called Ceilcote No. 648, the new material offers a high compression and tensile strength, extremely high grout-to-metal bonding strength and fast hardening. The grout is also said to successfully withstand vibration, load, temperature and corrosion conditions. *Ceilcote Co.*

Circle No. 16 on Readers' Service Card

High-density stock tank unloader

The application of a new concept and principle is embodied in a device for the unloading of high-density stock tanks. It is said that the device will unload high-density stock tanks at a continuing and even density of 4.5 per cent, or at whatever density the operation calls for, controlled within .2 of 1 per cent.

The unit operates through the use of a rotating head with integral shrouded nozzles that operate by sluicing and mixing the stock from the bottom of the tower. Speed of rotating head, size of nozzles and the

amount of water pressure determine the rate and density of discharge to the low-density agitator chest. *Tidland Machine Co.*

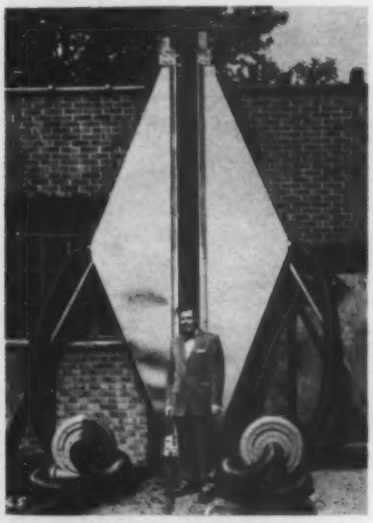
Circle No. 17 on Readers' Service Card

Centrifugal pumps

Three new sizes of corrosion-resistant centrifugal pumps—two with nearly twice the capacity of present models—have been added to the line of Karbate impervious graphite pumps manufactured by National Carbon Co.

Known as models 22-FAL, 28-FAL and 31-FAL, the new pumps are equipped with 1-, 1½- and 2-hp 1750-rpm motors. At this speed, the latter two types can deliver up to 150 gpm as compared to a top of 80 gpm for previous type F Karbate pumps. *National Carbon Co. Div., Union Carbide Corp.*

Circle No. 18 on Readers' Service Card



Sheet cleaner

The photograph above illustrates the Doyle Web Cleaner that is now being installed on papermaking machines.

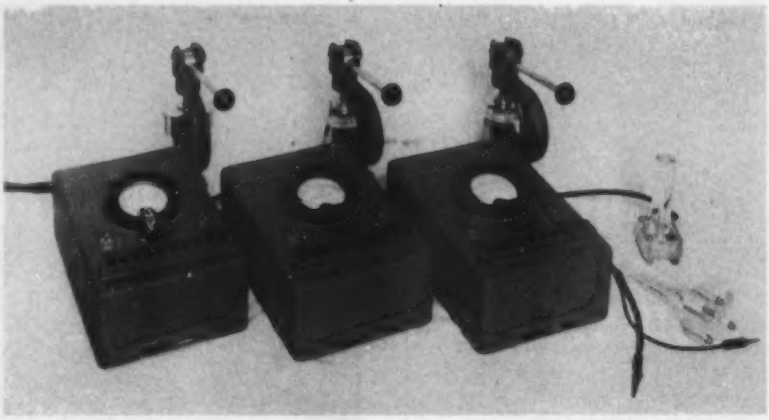
This cleaner automatically removes dirt, dust, lint, loose shreds or wads from the moving web—thus preventing hard spots from being calendered into the paper or loose slitter shreds being wound into the reroll. Air suction across patented diagonally-grooved nozzles provides an air velocity of 5000 fpm in three passes across the entire web.

The company states that the web cleaners are used on all kinds of paper from the fluffiest novel paper to the finest plastic playing card stock.

The cleaning equipment consists of a sheet brush and vacuum nozzle, a vacuum manifold, a flexible metal-covered particle withdrawal hose, a power-driven exhaust fan and a collector bag. The cleaner equipments are engineered with suitable modifications according to machine construction. The sheet brushes are adjustable and stir up and sweep all loose particles from the paper's surface into the air stream created by the suction. Grooving in the face of the nozzles permits a rush of air past the paper at all time. The exhaust manifold provides a constant pressure across the sheet but is somewhat stronger in the center.

The company welcomes your request for more technical information concerning this new type web cleaner. *J. E. Doyle Co.*

Circle No. 19 on Readers' Service Card



Moisture meter

The instrument pictured above is the K-209 Hart moisture meter. In appearance, the new meter is quite similar to the Type K-103 Hart meter, which has been long familiar in the industry.

One of the many new features embodied in the new design is the fully-automatic temperature correction—not only for differences in the temperature of the samples being gauged, but also for temperature differences in the electrode mechanism where the paper is clamped to make the measurements.

Equipped with a new electronic circuit, it has become possible to avoid the use of "excessively-high" voltages and at the same time preserve extreme sensitivity so that the range of the instrument can be extended farther down on the dry end. The avoidance of high voltages for making the measurements eliminates the possibility of any errors due to polarization, which can take place at either ac or dc when high voltages are used. Temperature correction is made via a thermister circuit. Only ac line-operated models are available.

The company states that each instrument is assembled on a custom-built basis and will meet, as ideally as possible, conditions under which it will be used. *Hart-Moisture-Meters.*

Circle No. 21 on Readers' Service Card

Continuous cooking unit

An announcement has been made of a new design in the Kamyr continuous cooking unit. The new unit is capable of producing 550-600 tons per day of top-quality bleachable kraft pulp. *Kamyr Inc.*

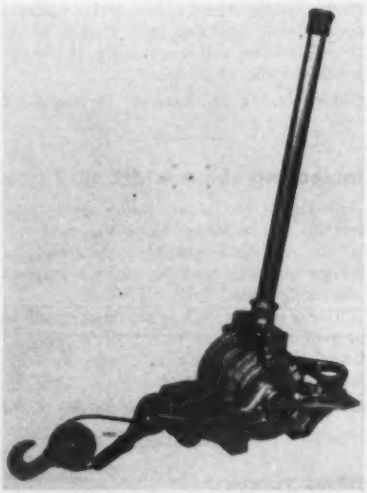
Circle No. 20 on Readers' Service Card

Electro-hydraulic, servo-control valves

A new servo valve has been introduced that can be used for precise electro-hydraulic control of fluid power on papermaking, converting and large printing machinery.

This new concept of single-stage, electro-hydraulic three- and four-way servo valve contains only two moving parts: a torque motor armature and a "swing-plate". There is no metal-to-metal contact between "swing-plate" and valve body. The valve is frictionless for higher sensitivity, fast response to minute signals and virtually eliminates sticking, scoring and jamming. *Oilgear Co.*

Circle No. 22 on Readers' Service Card



Heavy-duty power tool

The photo above shows the Multi-Pul tool that has been designed for a wide variety of functions.

A few of its many uses are: a hoist, winch, tackle, jib crane, portable crane, car

Left to right, are: John W. Benninghofen, partner; Robert P. Benninghofen, partner; Carl C. Shuler, partner; H. G. Tarter, V.P. Chamber of Commerce; Paul Benninghofen, partner, shown holding plaque; Arthur L. Lotz, V.P. Chamber and Chamber's chairman of Shuler and Benninghofen presentation; Arthur D. Fille, president of the Hamilton Area Chamber of Commerce.

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"For it is because of your confidence in us that we have been able to grow and expand through the years.

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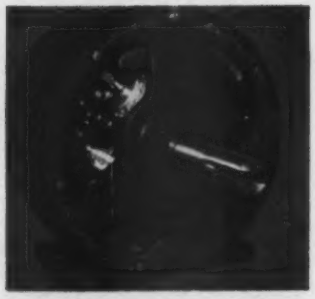


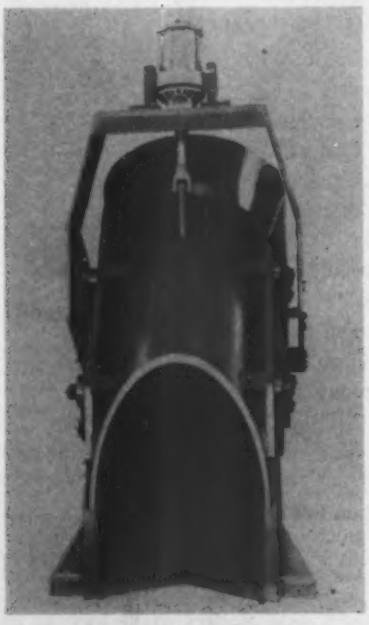
New Products . . .

puller, cargo tie-down and thousands of other lift, lower and pull operations.

Because the unit can accomplish the work of several men, it is indispensable as a time and labor saver. Only one operator is needed.

Another feature of the tool is that it is equipped with an internal expanding self-equalizing brake, thereby permitting the discharge of a load with safety and full control. *Indus Corp.*

Circle No. 23 on Readers' Service Card



V-type chipper spout

The unit pictured above is the Murco V-type chipper spout with pneumatic cylinder-operated cover.

The company states that the design of this new unit eliminates jam-ups by the use of a specially-designed hinged cover on the spout. The hinged cover is operated by a double-acting pneumatic cylinder with valve located convenient to chipper operator. The air-operated cylinder lifts spout cover vertically 2¾ in. to free jammed logs.

Operated from normal air supply, the air cylinder operates at pressures from 50-100 psi.

The "V" shape enables the spout to hold firmly any size stick or log from the smallest to the largest diameter. The wood moves in a straight line with no side movement to disturb cutting.

The unit is construced of heavy-duty design fabricated steel. Bed knives are arranged for easy removal. Spout bed knives are precisely positioned in relation to disc knives, resulting in a shearing action producing quality chips, yet eliminating splinters and sawdust. The unit can be installed on any make of pulpwood chipper.

The company welcomes your request for further details concerning this unit. *D. J. Murray Mfg. Co.*

Circle No. 24 on Readers' Service Card

Outside screw and yoke bolted bonnet valve

Announcement has been made of an improved type outside screw and yoke bolted bonnet valve for use with liquid level gages and instruments.

Inlet connections are available in five styles including union, flanged, socket welding, solid shank and spherical union. *Jerguson Gage & Valve Co.*

Circle No. 25 on Readers' Service Card

Pump motors

A new line of 48- and 56-frame jet pump motors have been designed especially for operation of water system centrifugal- or ejector-type pumps.

Termed "Jet-Line", the new motors have round frames with NEMA standardized 56C faces for direct pump mounting. They are equipped with grease-lubricated ball bearings designed for vertical or horizontal mounting.

Available in split-phase, capacitor-start and poly-phase models, the units are rated either 1/3 or 1/2 hp in the 48 frame. They come with single or dual voltage, either 2850 or 3450 rpm. Dual-voltage motors have spade connectors for ease in changing voltage. *Westinghouse Electric Corp.*

Circle No. 26 on Readers' Service Card

Stitching machine

"The use of this model H12P Silverstitcher (pictured above) has stepped up speed in the assembling of boxes", states a user.

It is said that boxes can be set up by one man, who also stitches the bottoms at the rate of 1000 per eight-hour shift.

Containers of different sizes can be stitched one after the other without machine adjustment. *Acme Steel Co.*

Circle No. 27 on Readers' Service Card

Close-coupled pump motors

A new line of close-coupled pump motors, standards and specials, from 7½-100 hp is now available from General Electric.

Known as the Tri-Clad 55 motors, they are designed to accommodate pumps built to the new recommended NEMA standards. *General Electric Co.*

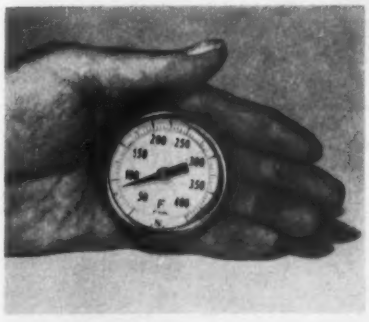
Circle No. 28 on Readers' Service Card

Variable-speed pulley for small motors

An extremely wide range of speeds now can be obtained from almost any ½-hp or

1-hp constant-speed motor by means of a variable-speed pulley mounted on an adjustable control base. The pulley is a double variable pitch unit, which automatically adjusts driver and driven sheave belt speeds according to its distance from the motor. *Lovejoy Flexible Coupling Co.*

Circle No. 29 on Readers' Service Card



Dial thermometer

Pictured above is the new American 2-in. Bi-Metal dial thermometer. This thermometer provides mounting convenience without sacrificing visibility.

Standard ranges are from: −80/120°F to 200/1000°F. and from −50/50°C to 100/500°C. Accuracy is within 1 per cent of range. *Manning, Maxwell & Moore Inc.*

Circle No. 30 on Readers' Service Card

Mechanical dust collector

Two new designs of the Cyclo-trell multiple-tube type mechanical dust collector have been announced.

Both designs are available in various capacities. The smallest utilizes a single row of three tubes and the largest 24 rows of tubes 14 tubes deep or a total of 336 cyclone tubes. Tubes are arranged in rows of 3, 4, 6, 8, 10, 12 and 14. *Research-Cottrell Inc.*

Circle No. 31 on Readers' Service Card

Automatic strapping machine

Pictured above is an automatic strapping machine called the Autostrapper. This machine uses oval-shaped steel strapping with a high tensile strength that can be used to reinforce extra large bales, pallet loads, cases and cartons.

The Autostrapper is a self-contained machine that uses hydraulic and pneumatic power to strap any product that fits the machine opening. The bundle opening may be any reasonable size or shape since it is formed by an endless chain. *Wiretyer Corp.*

Circle No. 32 on Readers' Service Card

Printed strapping

Printed steel strapping that displays the name or message of the user every 2 ft. is now being produced. The new product is known as Printon Strapping.

The customer's sales message can be printed in any one of seven different colors. The new product is available in 19 light-duty sizes ranging from ⅜ × .012 in. to ¾ in. to .023 in. *Allegheny Steel Band Co.*

Circle No. 33 on Readers' Service Card

Rubber-like adhesives

A new family of rubber-like adhesives that can't resist a strange molecular impulse to bond nearly any surface to itself or to another has been developed. *B. F. Goodrich Industrial Products Co.*

Circle No. 34 on Readers' Service Card

Chain saw

Six models of power chain saws make up the 1958-59 line now being introduced to the market by McCulloch Corp. Advanced

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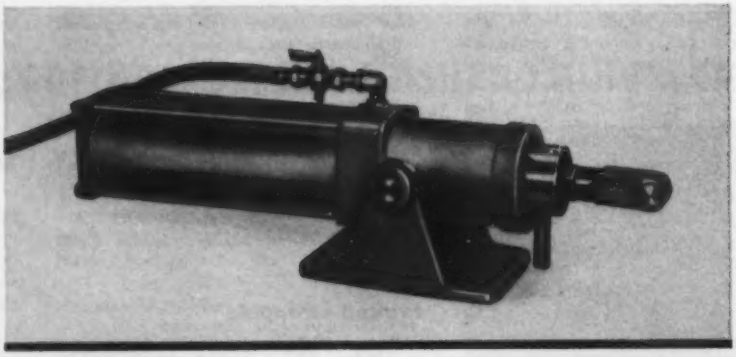
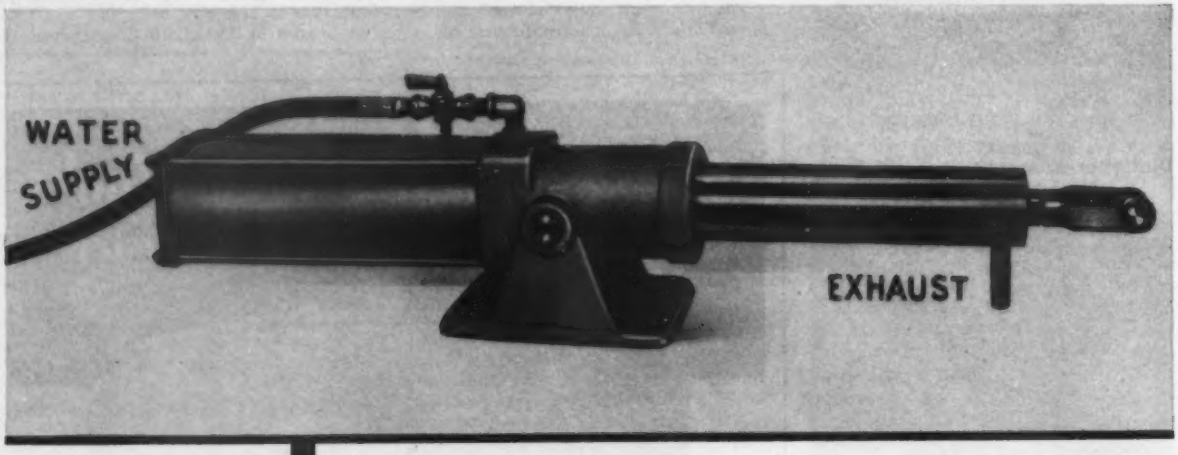
Kalamazoo TANK & SILO CO. KALAMAZOO MICHIGAN



LODDING

New Water-Operated Oscillator for Showers and Doctors



This Lodding development requires a relatively small volume of water for operation, produces a constant back and forth stroking action, or may be adapted to give a uniform rocking motion. Predetermined strokes, ranging from ¾ inch to 20 inches, are provided by the unit, while the rate can be varied easily from 1 to 25 strokes per minute while in motion.

In such applications as headbox showers, the rocking motion allows the shower to sweep the headbox by rotating through an angle of up to 90 degrees. The back and forth motion can be utilized for either doctors or showers.

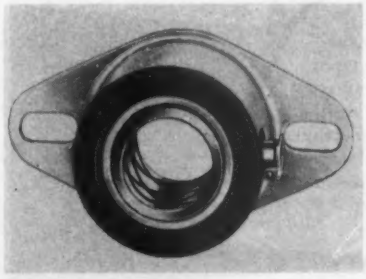
LODDING ENGINEERING CORPORATION
WORCESTER, MASSACHUSETTS

New Products . . .

engineering improvements have been featured in the new models giving users more horsepower, lighter weight, greater ease in handling and lower over-all maintenance costs.

Complete literature and specifications on these new models can be obtained. *McCulloch Corp.*

Circle No. 35 on Readers' Service Card

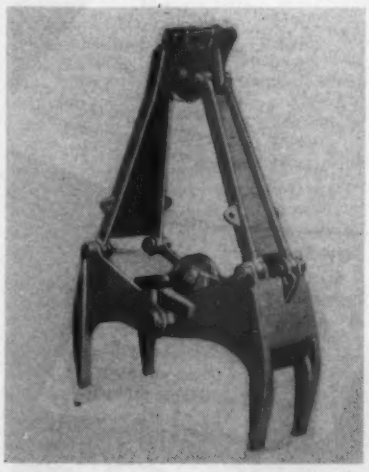


Sleeve bearing

A low-cost, two-bolt sleeve bearing that is interchangeable with most two- and four-bolt units has been announced.

Available for six standard shaft sizes from ½-1 in., the new bearings are ideal for general use where severe stress conditions do not prevail. Bolt size requirement is standardized throughout the series at 5/16 in. *Randall Graphite Bearings Inc.*

Circle No. 36 on Readers' Service Card



Log grapples

The photo above shows one of the two new designs of log grapples now available.

The ESCO light junior log grapple is designed for 1-in. loading line and will handle logs up to 65 in. in diameter. Its 2500-lb. weight makes it practical for use on machines 1¼ yard and larger in size.

The "O" log grapple (pictured above) weighs 1100 lb. and will fully close on a log as small as 5 in. in diameter. It will handle multiple log loads and has a maximum single-log load of 30 in. in diameter. It is designed for use with ⅜-in. loading line. It is also particularly adaptable to brush clearing or stacking. *Electric Steel Foundry Co.*

Circle No. 37 on Readers' Service Card

Weatherproof ac motor

A new weatherproof ac motor has been designed for use in outdoor-type applications where the motor is subject to extreme moisture.

An open motor that is said to exceed NEMA splash-proof requirements, all of its external parts are of corrosion-proof cast iron.

Complete engineering specifications and prices may be obtained from *Reliance Electric & Engineering Co.*

Circle No. 38 on Readers' Service Card

Brightness meter

The model 50 brightness meter, manufactured by the Allegany Instrument Co., has recently been improved to provide a front-panel bridge voltage control that permits very precise linearity adjustments for critical work.

The unit is mounted in a rugged aluminum casting and features very simple operation with digital (not vernier) readout. The standard brightness scale is used to eliminate the need for any correlation factors. *Allegany Instrument Co. Inc.*

Circle No. 39 on Readers' Service Card

Control valve

The new Uniflow type 1000 control valve is said to be a new concept in control valve design. It features a springless diaphragm motor operator using pre-formed Buna-N-Nylon diaphragms.

The split body is available in sizes 1—6 in. in steel, stainless steel, Monel and Hastelloy C. *Uniflow Valve Corp.*

Circle No. 40 on Readers' Service Card

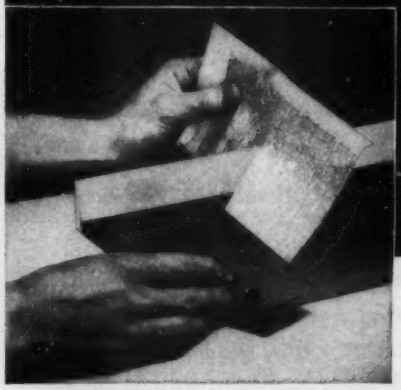
Gear grease in pushbutton aerosol cans

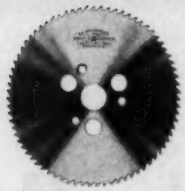
Acrolite Gear-Lube Spray is the name given to a new kind of gear grease that is now being offered in pushbutton aerosol cans.

The pushbutton aerosol method of application is without fuss or muss, and the operator may spray into hard-to-reach places. Gear-Lube is a heavy-duty lubricant that can be used on all types of printing machinery, construction machinery, factory, marine and other equipment where there are open gears, cams, wire rope, etc. *Acrolite Products Inc.*

Circle No. 41 on Readers' Service Card

KEENER EDGE...CLEANER CUT...
LONGER LIFE PER KNIFE...
WITH ATKINS Silver Steel





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ATKINS Silver Steel SAWS

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the complete paper mill line...

OK Keogel — An effective cold water swelling beater additive. Simple to use ... no cooking... just add to beaters. Requires no involved equipment or cooking procedures. Disperses readily ... causes no "Fisheyes." High resistance to breakdown ... for better starch retention and higher strength tests and fiber bonding.

OK Keofilms — Complete range of controlled viscosity thin boiling starches ... adaptable to many surface sizing problems.

OK Keozyme — High purity, consistent, carefully processed corn starch for enzyme conversion. Exacting quality control to insure low residue and optimum conditions for proper enzyme action. For surface sizing or pigment coating binder this starch offers highest quality available.

OK Keoclors — A new line of oxidized starches ... for coating adhesive and surface sizing application. Surface sizing at press or calender will benefit from controlled and stable viscosity, good penetration and color. Adhesive strength and colloidal characteristics offer improved bonding and operation for medium and low solids pigments coating.

OK Keocote — Enzyme converting corn starch with lower than normal peak viscosity. Particularly adaptable to operations requiring conversions at high starch solids or in presence of pigments. Low initial viscosity permits more rapid heat transfer and even conversion.

OK Special — Starches will be formulated for your needs... phone or write for a Hubinger paper starch representative who will be glad to help you solve any starch related problem.

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NEW LITERATURE

Books

AUTOMATIC CONTROL: PRINCIPLES AND PRACTICE. By Werner G. Holzbock. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Pages: 258. Price: $7.50.

This text offers the practical results of scientific research on control systems in non-mathematical terms. It provides the layman and technician alike with sound coverage of principles and applications.

The book begins with the dynamic behavior of control systems, including static requirements and adjustments for peak performance. Next, it covers mechanical and electrical components—measuring elements, controllers and the specific part played by control valves. The final section describes the various control systems and their specific applications.

Throughout the book the readers can derive direct benefits by understanding the design and application of control systems for automatic processes.

FUNDAMENTALS OF HIGH POLYMERS. By O. A. Battista. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Pages: 140. Price: $5.50.

Here is a unique presentation written especially for those who need a basic knowledge of the vast field of high polymer science.

The book covers the entire scope of the industry in a condensed, fundamental manner. The basic terms, definitions and the chemistry of high polymers precede chapters on the creation of a high polymer, the architecture and geometry of long-chain molecules, solution and solid state properties, physical properties and the future of high polymers. A general bibliography provides an extensive guide to the published literature.

PROBLEMS IN WOOD CHEMISTRY. Published by Weizmann Science Press of Israel, 33 King George Ave., Jerusalem. Pages: 136. Price: $6.00.

This volume contains lectures and discussions that took place during the meeting of the Panel of Experts on Wood Chemistry of FAO in Israel in April 1956. The subject was chosen in view of its general importance and of its particular significance for the Middle East, where wood is scarce and where the best possible use must be made even of the lowest grades.

The subjects covered in this volume are: radiation chemistry and wood; chemistry, morphology and mechanical properties of the compound middle lamella; the middle lamella of the bast fibers; the problem of carbohydrate lignin bonding in wood; expanding wood utilization through the use of resins; a few principles of adhesion; new developments in synthetic resin for wood adhesives, and a review of recent literature on synthetic adhesives for wood.

USDA Reports

PUBLICATIONS AVAILABLE from the U. S. Forest Products Laboratory. Here is a list of new publications available from the laboratory: Control of Decay and Sap Stain in Logs and Green Lumber—Report No. 2107, which aims at the control of decay and stain in logs and describes inexpensive ways of controlling such damage; Advances in Sawing from Forest to Shop—Report No. 2100, dealing with the progress that has been made in the fields of saws and sawing through consistent research programs. Two other publications are: List of Publications on Chemistry of Wood and Derived Products—No. 238 and List of Publications on the Growth, Structure and Identification of Wood—No. 177. Copies of these publications are available free of charge by writing to the Director, U. S. Forest Products Laboratory, Madison 5, Wis.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Laboratory stirrer

Eberbach Corp. is distributing a bulletin describing its new model 58 Power-Stir. The Power-Stir is a laboratory stirrer with improved design.

Circle No. 42 on Readers' Service Card

Liquid level controls

Electronics Corp. of America illustrates and describes its complete line of liquid

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level controls for universal industrial application in a new bulletin. A concise selector guide is presented that enables quick selection of the appropriate control system for liquid level applications.

Circle No. 43 on Readers' Service Card

Feedwater heaters

Stickle Steam Specialties Co. is issuing a six-page bulletin covering the operation and features of the company's baffle spray-type deaerating feedwater heaters. Featured is a large cutaway drawing of a unit with a step-by-step operating description, a review of the counter flow principle and reasons for a vent condenser. Also included is a list of data required for ordering a feedwater heater, an outline of major savings that can be expected and a discussion of equipment and construction features.

Circle No. 44 on Readers' Service Card

Instrumentation and equipment for automation of the process industries

B-I-F Industries Inc. has published an eight-page bulletin containing photographs, operational data and design feature descriptions of 12 varied products for positive control of materials in motion.

Circle No. 45 on Readers' Service Card

Aluminum sulfate

General Chemical Div., Allied Chemical & Dye Corp. has prepared a technical bulletin to supply selected data that years of customer contact have indicated as being most helpful and most frequently required. Some represent original work by the company's research, engineering and production staffs and are not available elsewhere. Other data have been gathered from many sources. All are useful to those using aluminum sulfate in their operations.

Circle No. 46 on Readers' Service Card

Motors

General Electric Co. describes the company's Tri-Clad 55 ac wound rotor motors in a new bulletin just published. Ratings, dimensions and cutaway view showing internal construction are all given in the bulletin.

Circle No. 47 on Readers' Service Card

Steel roller chains and sprockets

Link-Belt Co. has written a comprehensive book on precision steel roller chains and sprockets. The book contains 154 pages of detailed engineering data illustrating roller chain's versatility in applications. Indexed for easy reference, the book describes the selection, application, installation, lubrication and maintenance of roller chain casings, etc.

Circle No. 48 on Readers' Service Card

Vinyl stearate

Air Reduction Chemical Co. Div., Air Reduction Co. Inc. has published a new product data sheet describing the vinyl stearate chemical. This chemical has been investigated extensively as a comonomer with many other nomomers. It is primarily of interest in copolymerization with other nomomers to provide permanent flexibility to an otherwise brittle resin.

Circle No. 49 on Readers' Service Card

Hypochlorite solutions

Pennsalt Chemicals Corp. is offering a technical bulletin titled, "Automatic Continuous Manufacture of Hypochlorite Solutions." The 10-page bulletin plus four graphs gives complete details and description.

Circle No. 50 on Readers' Service Card

Corrosion-resistant process equipment

Pfaudler Co., Div. of Pfaudler Permutit Inc. A buyer's guide to corrosion-resistant process equipment has been published by this company. The 12-page guide includes information on all types of Pfaudler glassed-steel and alloy equipment including several new products.

Circle No. 51 on Readers' Service Card

Agitating-circulating pumps

Warren Pumps Inc. has published a bulletin featuring types PLS and PC high-volume, low-head pumps for agitating, circulating and blending in stock chests. The bulletin includes basic features and advantages of the pumps, sectional drawings, dimensions, design details and typical installation views.

Circle No. 52 on Readers' Service Card

Loading assembly

Jordan Industrial Sales Div., OPW Corp. has printed a two-page bulletin designed to be inserted into the existing 24-page catalog F-32-R. The bulletin describes four new OPW-Jordan loading assembly standard models.

Circle No. 53 on Readers' Service Card

Handbook of resins for wet-strength paper

Rohm & Haas Co. is offering a new 24-page booklet entitled, "Uformite Resins for Wet Strength Paper". The chemical and physical properties of these resins, their stability, storage and handling requirements are discussed. Other important considerations are also reviewed.

Circle No. 54 on Readers' Service Card

Ion exchange regeneration

Graver Water Conditioning Co. gives ten methods of ion exchange regeneration in a new technical reprint. The article tells how each of the ten methods work and what controls and equipment are required in each case. Each method is illustrated.

Circle No. 55 on Readers' Service Card

Shaft-mounted speed reducers

Link-Belt Co. has described its completely new line of shaft-mounted speed reducers in a new 24-page book. Engineering and selection information on these drives are discussed.

Circle No. 56 on Readers' Service Card

Glycols

Jefferson Chemical Co. Inc., in a 40-page bulletin, presents a comprehensive review of the physical and chemical properties and industrial uses of ethylene glycol, diethylene glycol, triethylene glycol and tetraethylene glycol.

Circle No. 57 on Readers' Service Card

Insulation adhesives

Insul-Coustic Corp. is issuing a bulletin containing information on Insul-Coustic insulation adhesives, weather-proofing, coatings, vapor barriers and sealing compounds.

Circle No. 58 on Readers' Service Card

Rotary blowers and pumps

Sutorbilt Corp. gives full details on continuous-service rotary positive-pressure blowers, gas and vacuum pumps in a new 20-page bulletin now being offered. The bulletin contains photographs and cutaway drawings on all of the blowers and gas pumps, showing their construction in detail.

Circle No. 59 on Readers' Service Card

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Dozens of pieces of paper mill equipment — chippers, rolls, head boxes, pumps, etc. Some new, some used but with a lot of good service still ahead of them. For complete listing and full details contact Purchasing Department, Section A, Box 570, Savannah, Georgia.

ENGINEER

A medium size Mid-west multiplant paper company has an immediate opening for a graduate engineer at the General Staff level. The ideal applicant should be 25 to 35 years of age with a degree in mechanical, chemical or civil engineering. He will have 2 to 5 years experience in the paper or allied industry. Experience in hydraulics and the application and installation of heavy industrial equipment is highly desirable.
He should be personable and capable of operating with a minimum of direction and control. He must be able to sell himself and his ideas to line management. Our company has an outstanding growth record in the industry and is continuing to expand. This vacancy occurred because of promotion of one of our engineers to Division Engineer. Salary thinking $7000 to $9,000 plus all fringes. Our employees know of this ad. Please send resume to Personnel Director, P. O. Box 1033, Hutchinson, Kansas.

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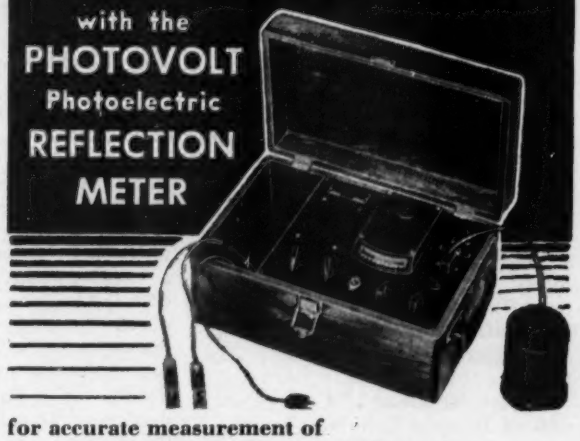

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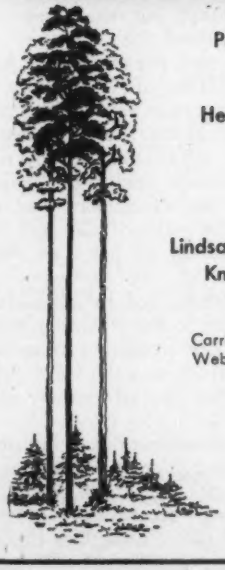

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Safety News . . .
(Continued from page 476)

Pulp Mill Safety Record Set by Buckeye Cellulose

Buckeye Cellulose Corp. of Memphis, Tenn., has established a new world's record for the safe operation of a pulp mill.

The 555 mill employees have completed more than 3,184,000 consecutive man-hours without lost-time injury, thus bettering the previous record set from 1953 to 1956 in the same plant. The current period of safe operations began January 23, 1956.

Procter & Gamble Co., parent firm of Buckeye Cellulose, has captured world safety records in three other fields of manufacturing: soap and glycerine, fats and oils and shell-loading (explosives).

APPA Award

The Memphis mill of Buckeye Cellulose has also been announced as heading the list of winners of the 1957 safety award sponsored by the American Paper & Pulp Association.

Based on the low five-year cumulative disabling injury frequency rate of 0.62, the plant won not only the national award but also had the lowest rate of the mills reporting from the central region (Delaware, Maryland, Virginia, West Virginia, North Carolina and Tennessee).

Other regional winners based on frequency rates were: Flintkote Co., Mt. Carmel, Ill. (Midwest States); Falls Paper & Power Co., Oconto Falls, Wis. (Lake States); P. H. Glatfelter Co., Spring Grove, Pa. (Mid-Atlantic States); Crossett Paper Mills, Crossett, Ark. (Southern States); Fraser Paper Ltd., Madawaska, Maine (New England), and Crown Zellerbach Corp., Port Townsend, Wash. (Pacific Coast).

Sutherland Wins FPBA Award

Sutherland Paper Co. of Kalamazoo, Mich., has been named the recipient of the Directors' Safety Award presented by the Folding Paper Box Association of America. The award is based on the achievement by a member company of 1,000,000 consecutive man-hours without a disabling or work-loss injury.

The recent presentation to Sutherland marks the third consecutive 1,000,000 injury-free man-hours logged by the carton manufacturer.

In making the award, Gustav L. Nordstrom, executive director of the FPBA, declared: ". . . Today's presentation represents the first time in the seven-year history of the Directors' Safety Award that it has served to recognize 3,000,000 consecutive injury-free man-hours—an outstanding record in the folding carton industry".

Over-all results of the association's safety program—undertaken in 1951—have been described by Dr. Karl F. Simpson, spokesman for the industrial relations committee: "As a result of the program, the frequency of injuries . . . has been reduced from 11.34 per 1,000,000 man-hours of work in 1952 to 7.18 per 1,000,000 man-hours of work during 1957. This represents a reduction of 37 per cent and reflects a 9-per cent reduction during 1957 alone, when the 174 participants earned a total of 80 individual safety award certificates."

35 Perfect Scores Reported for First Quarter in SPPSA

Thirty-five firms reporting to the Southern Pulp & Paper Safety Association maintained perfect records during the first three months of 1958.

For pulp and paper mills the over-all accident frequency rate during the January-March quarter was 5.96. This compares to 6.17 for the whole of 1956 and 6.56 for 1957. There were 18 perfect scores.

In paper converting only one box plant escaped injury during the three-month period. The quarterly frequency rate was 9.19; for 1956, 7.88, and for 1957, 10.20.

Seven bag plants maintained perfect records, with an over-all frequency in this classification of 5.90. The rate for 1956 was 7.17, while for 1957 it was 6.68.

Woods operations posted nine perfect scores. The frequency for all reporting units was 9.73. This compares to 22.04 for 1956 and 17.93 for 1957.

Southern Perfection

Perfect scores in the four classifications as reported by the SPPSA were achieved by:

Pulp and Paper Mills: Champion Paper & Fibre Co., Pasadena, Texas; St. Joe Paper Co., Port St. Joe, Fla.; National Gypsum Co., Mobile, Ala.; Brunswick Pulp & Paper Co., Brunswick, Ga.; Calcasieu Paper Co., Elizabeth, La.; Buckeye Cellulose Corp., Memphis, Tenn.; Southern Paperboard Corp., Port Wentworth, Ga.; Buckeye Cellulose Corp., Foley, Fla.; Owens-Illinois Glass Co., Valdosta, Ga.; Owens-Illinois Glass Co., Jacksonville, Fla.; Rome Kraft Co., Rome, Ga.; Container Corp. of America, Fernandina Beach, Fla.; Mead Corp., Sylva, N. C.; Owens-Illinois Glass Co., Big Island, Va.; Certain-Teed Products Corp., Savannah, Ga.; Orange Pulp & Paper Mills Inc., Orange, Texas; Mead Corp., Nashville, Tenn. (plant closed); Banner Fibreboard Co., Wellsburg, W. Va.

Box Plants: National Container Corp., Jacksonville, Fla.

Bag Plants: Olin Mathieson Chemical Corp. (Forest Products Div.), West Monroe, La.; International Paper Co., Mobile, Ala.; Crown Zellerbach Corp. (Gaylord Container Corp. Div. Bag Plant), Bogalusa, La.; Kraft Bag Corp., St. Marys, Ga.; St. Regis Paper Co., Franklin, Va.; Albemarle Paper Mfg. Co., Richmond, Va.; Crown Zellerbach Corp. (Gaylord Container Corp. Div. Multiwall Plant), Bogalusa, La.

Woods Operations: International Paper Co. (Gulf Region), Mobile, Ala.; Riegel Paper Corp., Bolton, N. C.; North Carolina Pulp Co., Plymouth, N. C.; Rayonier Inc., Fernandina Beach, Fla.; Union Bag-Camp Paper Corp., Franklin, Va.; Buckeye Cellulose Corp., Foley, Fla.; Continental Can Co. Inc. (Southern Advance Bag Operation), Hodge, La.; Container Corp. of America, Fernandina Beach, Fla.; Scott Paper Co. (Hollingsworth & Whitney Div.), Mobile, Ala.

NSC Reports Over-all Frequency Drop

Workers employed by member companies of the National Safety Council had fewer injuries in 1957 than in 1956, but the injuries suffered were more severe.

Of the 40 basic industry classifications, 21 either reduced their frequency rates or showed no change. Nineteen either cut their severity rates or remained the same.

The pulp and paper industry had a frequency rate of 7.15, down 1 per cent from the year before but considerably above the all-industry average of 6.27. In the severity column, however, pulp and paper rose above the all-industry average (740) with a mark of 696 and reduced its rate by 17 per cent from 1956.

The 6.27 recorded by all industries reporting to the NSC represented a 2-per cent reduction from the previous year. It was the third time in history that the all-industry rate was under 7.

The communications industry again led the field with an employee frequency rate of 1.00. Aircraft manufacturing—second in 1956—was nudged into third place by the electrical equipment industry.

MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.90— .95
No. 2 roofing (Chicago)	.60— .65
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	6.00— 7.00
No. 1 manila rope, foreign	5.00— 6.00
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—100.00
No. 1 hard white shavings	80.00— 85.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	50.00— 55.00
Fly leaf shavings No. 1	20.00— 25.00
Fly leaf, woody, No. 1	20.00— 25.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	13.00— 14.00
Ledger stock, white, No. 1	50.00— 52.50
Ledger stock colored, No. 1 (Midwest ship)	25.00
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	70.00— 75.00
Colored tab cards	50.00— 55.00
New northern kraft envelope cuttings	60.00— 65.00
Triple sorted kraft, 100%	30.00— 35.00
No. 1 old kraft	25.00—
White news cuts, No. 1	47.50— 52.50
No. 1 overissue news	22.00— 24.00
Folded news, special	20.00— 21.00
Folded news, ordinary	18.00— 19.00
Old corrugated boxes	24.00— 25.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	9.00— 11.00
No. 1 mixed paper	9.00— 11.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	60.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	115.00—
L. c. l., ton	125.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 98%, drums c. l., delivered lb.	29½—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb	.12¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	9.05—
N	9.20—
WG	9.70—
WW	9.80—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M.	7.80—
N	7.90—
WG	8.25—
WW	8.50—
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅛—
High-tinting, drums, c. l., lb.	.14⅛—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15⅛—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—162.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15

Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90

Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10

Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35

Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25

No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.00

(Sheets — Plus 30c cwt)

Degradation of Cellulose

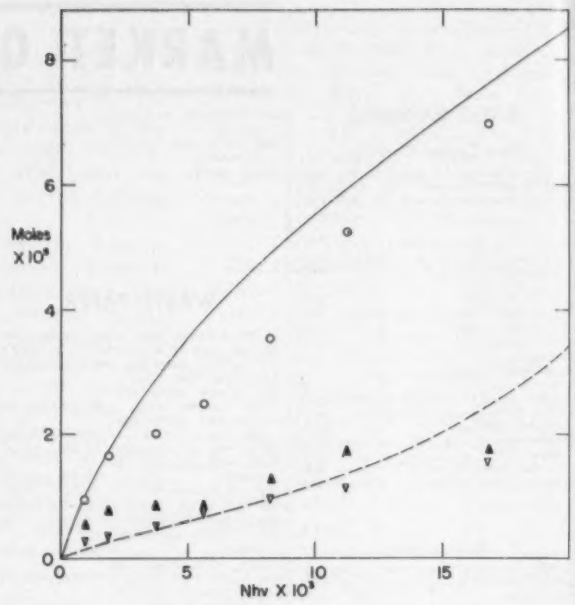
(Continued from Page 451)

lated number of chain fractures, indicating that these reactions may be related.

Experimental procedure

For the present investigation purified, dried cotton cellulose was irradiated in an evacuated system with 2537-A light. The cellulose was made into sheets on a handsheet machine and cut into rectangles of 92 cm², 0.0018 cm thick and weighing 0.86 g. A cellulose sheet was placed around a "cold finger" of pyrex glass through which water from a constant-temperature bath was circulated. The cold finger was sealed into a large quartz tube that was inserted axially into an etched cylindrical aluminum reflector. A stopcock connected the quartz tube to a vacuum manifold and to the various measuring instruments.

The cellulose was irradiated by five low-pressure mercury lamps set vertically at even intervals around the inside surface of the aluminum reflector. The operating temperature of the lamps was maintained at 40° ± 1°C by an airblower fitted into the top of the reflector so that the energy in the ultraviolet region resulted almost entirely from the 2537-A° Hg line. Intensity of the irradiating light was determined by means of a sensing device that had been calibrated against a standard source in the Bureau's radiometry laboratory.



Degradation products of cellulose radiated by ultraviolet light. Graph shows number of moles formed of aldehyde (o), carboxyl (solid triangle), hydrogen (————), carbon monoxide and carbon dioxide (.....) and chain fractures (open triangle), plotted against time of exposure to 2537-A light at 40°C. The close parallel between amounts of carboxyl formed and the calculated number of chain fractures indicates that these reactions may be related.

The pressure of evolved gas was measured by a thermocouple gage, a discharge gage and a mercury manometer. Composition of gaseous products was determined with a mass spectrometer. The irradiation apparatus and reaction vessel assembly permitted the gas to be rapidly removed to a collection point, thus preventing complicating interactions with highly reactive residues that remained attached to the solid.

Investigations are continuing at the Bureau to obtain further information on the mechanisms of this important degradative reaction. Data compiled from the cumulative studies will be used to devise and evaluate methods for making paper more stable on exposure to light.

*For further technical details, see "Degradation of cellulose in a vacuum with ultraviolet light" by Joseph H. Flynn, William K. Wilson and William L. Murrow, *J. Research, NBS* 60, 229 (1958).

Riegel's New Board Machine

(Continued from Page 443)

cycle causing the press platens to come in contact with the roll, squeeze the crimps and set the glue on the heads. After a predetermined time, the press platens move away, and the roll is ejected to the scale feed conveyor, which is mounted directly on a scale.

The scale operator then applies the labels, records the roll weight, stamps the weight, etc., and "knees" the roll off the conveyor to the lowerator feed ramp. This ramp is inclined in such a manner as to gravity-feed the rolls into the lowerator and provide ample storage to insure continuous operation.

The ramp is equipped with a deck stop that prevents the roll from entering the lowerator when the tray is not in the "up" position. The tray remains in the "up" position until the scale operator energizes the down cycle. A "photo light" located on the lower floor on the discharge side of the lowerator serves a special function of preventing the lowerator tray from returning to the "up" position until the roll clears the discharge opening.

Steam generator

A new bark-, gas- and oil-burning steam-generating unit designed to supply 200,000 lb. of steam per hour is equipped with complete combustion controls insuring efficient combustion conditions for all fuels under all conditions.

A master steam pressure controller regulates the gas or oil and combustion air supplied in accordance with demand. The bark input and under grate air are set manually by the operator. The readjusting signal introduced by the oil or gas-air ratio maintains optimum firing conditions.

A steam flow meter measures total flow of steam produced by the boiler. An oxygen analyzer that measures the per cent oxygen in the flue gases, can be used to adjust the amount of combustion air admitted to the bark grates.

The steam-generating unit is further equipped with three-element feed water controls, steam temperature controls, metering equipment and combustion safeguard for gas firing.

Groundwood from Poplar

(Continued from Page 450)

groundwood. The great increase in folding endurance, tear strength, tensile and the wet web strength enables us to get along with the relatively low slowness in grinding poplar after a monosulfite treatment. In addition to the advantage of an improved drainage property, the production of chemically pre-treated poplar pulp increases remarkably while the energy consumption of grinding decreases. Moreover, certain poplar chemigroundwoods are even brighter than normal poplar groundwood and do not need bleaching if used for newsprint.

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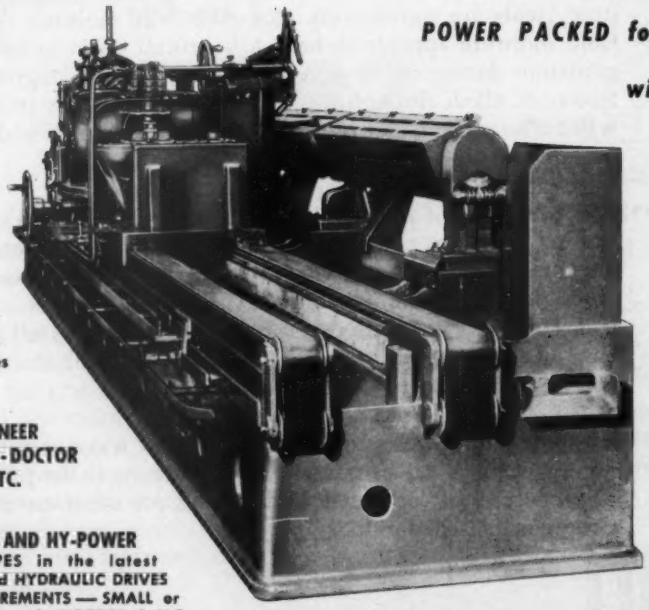

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Capacity—84" to 396" lengths; Motors — 7½ to 40 H.P., Balanced; Drives — Mechanical - Hydraulic; Speeds—10' to 150 ft. per min.; Wheels—16"-20"-24" Dia.; Types — Cylinder - Segmental; Bearings — 100% Ball and Roller Types

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KNIVES-ROTARY CUTTERS-DOCTOR
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TRAVELLING TABLE TYPES in the latest MECHANICAL-ELECTRIC and HYDRAULIC DRIVES to meet ALL KNIFE REQUIREMENTS — SMALL or LARGE from 32" to 240" with MOTORS 3 H.P. up to 75 H.P.

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3 — Cleaner Cut Material

4 — Reduced Knife Costs

5 — Longer Knife Life with Less Changes

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Main Plant
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PAPER INDUSTRY

Whither?...

...in production, processes, new products, markets

Cross-linked dicarboxyl starch

Cross-linked dicarboxyl starch is a new starch derivative developed by the United States Department of Agriculture. It can be used as a thickening agent in various paste-like products and industrial applications where ordinary starch cannot be used due to its jellying property on cooling.

Cross-linked dicarboxyl starch absorbs water and swells on heating but does not jell on cooling. This property can be exploited in the preparation of a variety of non-jelling paste-like products that have extremely high viscosities.

Peroxide bleaching

Alkaline peroxide solutions used in a bleaching system that includes both chlorine dioxide and peroxide stages produces pulps of 89-91° GE brightness and strengths almost comparable to those of unbleached pulps, according to A. F. Chadwick of duPont's Electrochemicals Department.

The chemicals used in the peroxide stage are: H_2O_2, 0.25 per cent; NaOH, 0.3 per cent; sodium silicate, 3.0 per cent, and Epsom salt, 0.05 per cent. Optimum operating conditions are: 15 per cent pulp consistency, 180° F temperature and 4 hrs. reaction time.

Importance of chip moisture in kraft pulping

Results obtained by W. J. Nolan of the University of Florida show that pulp yields are significantly affected by the moisture content in the chips. Chip moisture appears to have a beneficial effect in reducing cellulose degradation during cooking. As the fibers become delignified, permitting diffusion of alkali through the cell wall, the moisture in the lumens and cell walls dilutes the alkali in contact with the cellulose and thus reduces cellulose degradation.

Flash drying of pulp

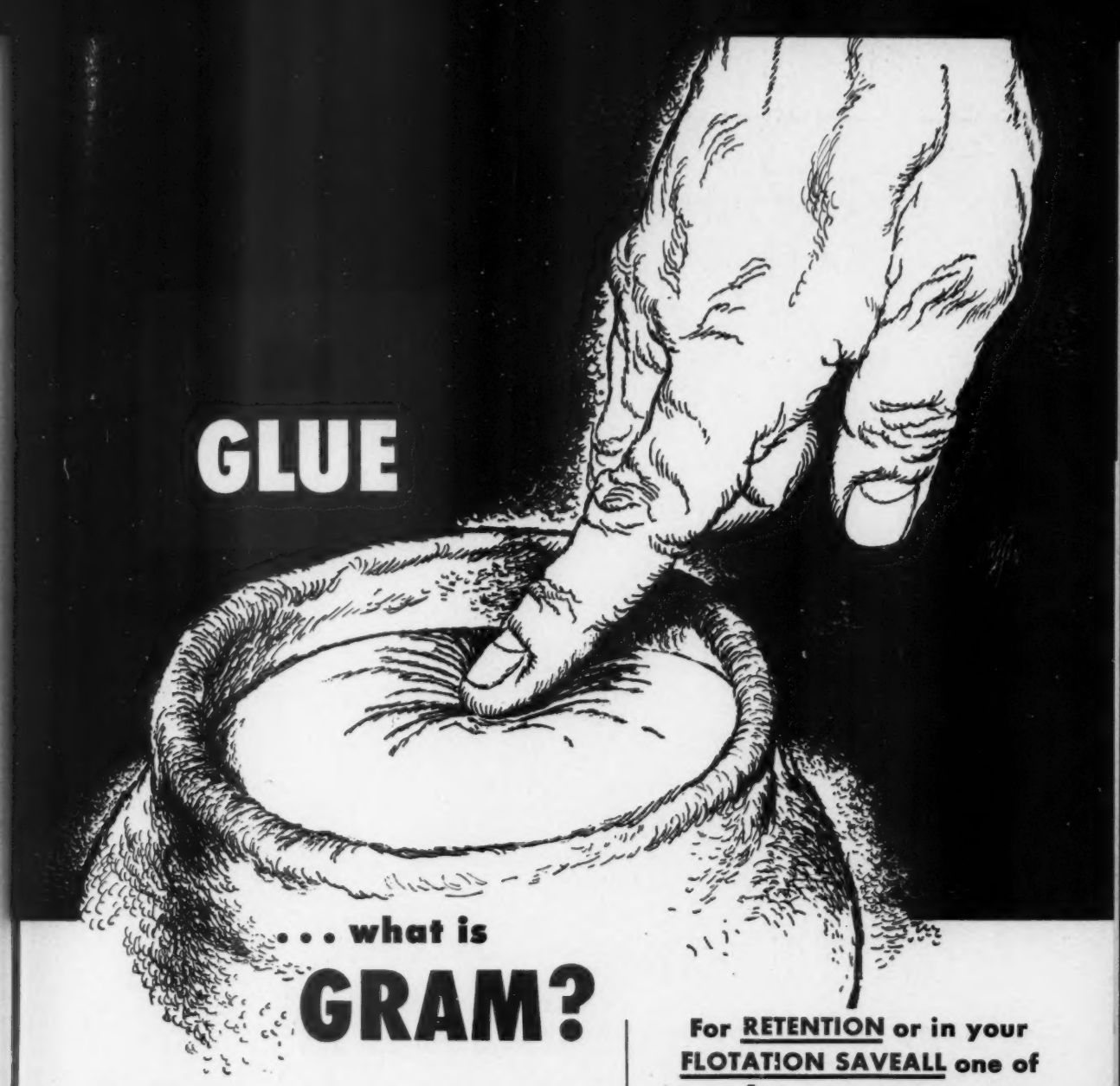
A new method of pulp drying has been developed by D. and S. Engineering Ltd. of Vancouver, B. C. The method uses a direct-fired air heater and a pneumatic conveying system in which the drying takes place. The pulp is fluffed in a hammermill prior to drying.

The dried pulp has the same or slightly improved properties as shown by conventionally dried pulps. Its reported tear value is slightly superior, and it is also easier to slush on repulping.

Resin reduction in bleached pulp

A Swedish mill uses a caustic pre-treatment stage ahead of the chlorination stage, resulting in a satisfactory resin reduction in the pulp.

The cost of the caustic soda in this pre-treatment is estimated at $1.50 per ton of bleached pulp.



. . . what is GRAM?

• To the animal glue manufacturer, buyer or user, "*gram*" doesn't mean HOW MUCH.

It's a measurement of GEL STRENGTH, which in turn is an indication of flocculating activity.

In the old days, the strength of a glue was judged by poking a finger into a chilled glue gel. The degree of resistance determined the grade.

Today, modern laboratory apparatus replaces the "finger poking" technique and accurately measures gel strength in terms of weight in grams.

Also, better *production* techniques are now yielding much higher gel strength bone glues.

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For RETENTION or in your FLOTATION SAVEALL one of these 6 grades will serve you best and most economically

- GREEN STRIPE . . . . . 196-220 grams
- ORANGE STRIPE . . . . . 171-195 grams
- ORANGE STRIPE . . . . . 146-170 grams
- RED STRIPE . . . . . 121-145 grams
- RED STRIPE . . . . . 101-120 grams
- RED STRIPE . . . . . 81-100 grams

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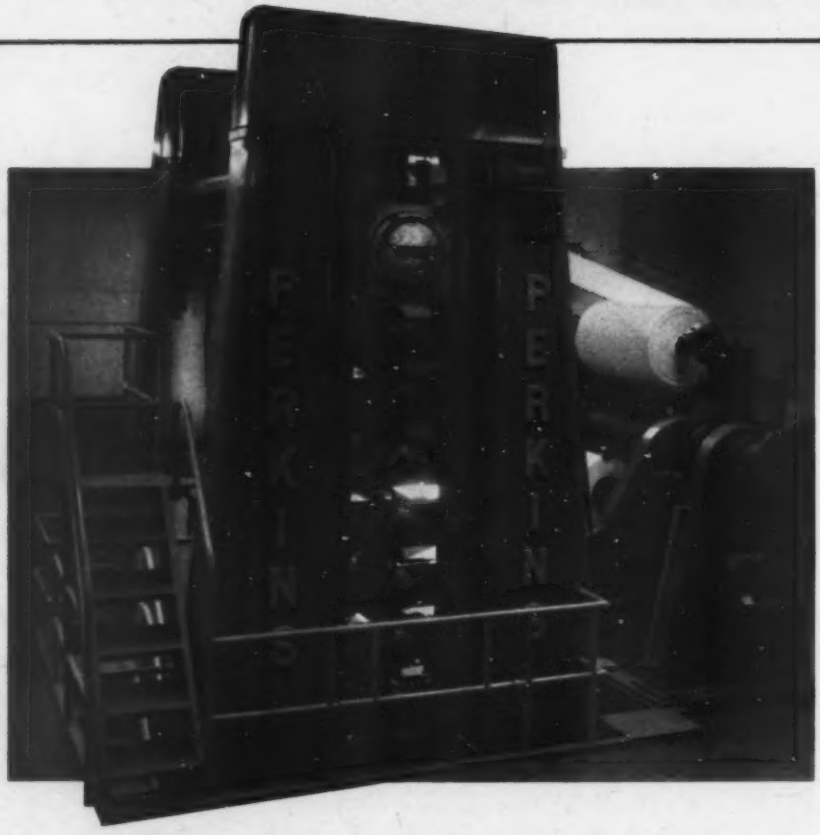

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